ROLE OF ASPIRIN IN VENOUS THROMBOEMBOLISM (VTE) PROPHYLAXIS FOLLOWING TOTAL KNEE ARTHROPLASTY

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BY

DR. AMOL RATTAN

SUPERVISOR

DR. DEEPAK JAIN

DEPARTMENT OF ORTHOPAEDICS

DAYANAND MEDICAL COLLEGE AND HOSPITAL

LUDHIANA

(MAY 2021)

DECLARATION

I declare that the thesis entitled **"ROLE OF ASPIRIN IN VENOUS THROMBOEMBOLISM (VTE) PROPHYLAXIS FOLLOWING TOTAL KNEE ARTHROPLASTY"** has been prepared by me under the guidance of **Dr. Deepak Jain,** Professor, Department of Orthopaedics, Dayanand Medical College and Hospital, Ludhiana. No part of this thesis has formed the basis for the award of any degree previously.

_____

Dr. Amol Rattan

Department of Orthopaedics

Dayanand Medical College & Hospital
Ludhiana-141001 Punjab

Date:

CERTIFICATE

I certify that **Dr. Amol Rattan** has prepared his thesis entitled **"ROLE OF ASPIRIN IN VENOUS THROMBOEMBOLISM (VTE) PROPHYLAXIS FOLLOWING TOTAL KNEE ARTHROPLASTY"** for the award of degree of M.S. in Orthopaedics of Baba Farid University of Health Sciences, under my guidance. He has carried out the work at the Department of Orthopaedics, Dayanand Medical College & Hospital, Ludhiana.

Supervisor

Dr. Deepak Jain
Professor
Department of Orthopaedics
DMC&H, Ludhiana

Co-Supervisor

Dr. Shekhar Singal
Associate Professor
Department of Orthopaedics
DMC&H, Ludhiana

Date:

ENDORSEMENT BY THE HEAD OF THE DEPARTMENT AND PRINCIPAL

This is to certify that the thesis entitled **"ROLE OF ASPIRIN IN VENOUS THROMBOEMBOLISM (VTE) PROPHYLAXIS FOLLOWING TOTAL KNEE ARTHROPLASTY"** is a bonafide research work done by **Dr. Amol Rattan** under the guidance of **Dr. Deepak Jain**, Professor, Department of Orthopaedics, Dayanand Medical College & Hospital, Ludhiana.

Head of Department

Dr. Rajnish Garg
Professor & Head
Department of Orthopaedics
DMC&H, Ludhiana

Principal

Dr. Sandeep Puri
Principal
DMC&H, Ludhiana

Date:

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Dr. Amol Rattan

Department of Orthopaedics

Dayanand Medical College & Hospital
Ludhiana

Date:

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Dedicated

To

My Family

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Dr. Amol Rattan

ABBREVIATIONS

COX	Cyclooxygenase
CUS	Venous Compression Ultrasound
DVT	Deep Vein Thrombosis
GCS	Graduated Compression Stockings
IPCD	Intermittent Pneumatic Compression Device
LMWH	Low Molecular Weight Heparin
NSAIDS	Non-Steroidal Anti-Inflammatory Drugs
OA	Osteoarthritis
PE	Pulmonary Embolism
PG	Prostaglandins
PRE-OP	Pre Operatively
POST-OP	Post Operatively
RA	Rheumatoid Arthritis
THA	Total Hip Arthroplasty
TKA	Total Knee Arthroplasty
TJA	Total Joint Arthroplasty
VFP	Venous Foot Pumps
VKA	Vitamin K Antagonist

ABSTRACT

Introduction: Patients undergoing total knee arthroplasty (TKA) are at high risk of venous thromboembolism (VTE) including deep vein thrombosis (DVT) and pulmonary embolism (PE). Prophylaxis has been recommended after TKA. Various agents used for DVT prophylaxis are aspirin, heparin, LMWH, factor Xa inhibitors, direct thrombin inhibitors etc. Many of these agents are expensive and cause side effects like bleeding, skin necrosis, thrombocytopenia, hematoma etc. Acetylsalicylic acid (aspirin) has been proposed as an effective agent for VTE prophylaxis following a (TKA). Its role needs to be redefined especially in Indian population.

Aims and Objectives: To study the role of aspirin in prevention of venous thromboembolism (VTE) following total knee arthroplasty (TKA).

Materials and Methods: A prospective review of 166 patient undergoing TKA, (93 Bilateral and 73 unilateral), making it to a total of 259 operated knees. Out of 166 patients in the study , there were 114 female patients and 52 male patients with the average age of patients being 63.0 years and range being 37-87 years. Patients were given low molecular weight heparin (Enoxaparin 40mg OD s/c) during hospital stay and started on Aspirin 150mg once daily for four weeks on discharge. Patients were followed up for average period of 15.75 months. Assessment was made using the Modified Well`s criteria for DVT and PE.

Results: We had the final follow up of all 166 patients included in the study. None of the patient developed any signs and symptoms of DVT/PE. Modified Well's score for DVT and PE was less than two and less than four respectively. None of the patient required doppler of bilateral lower limb or CT pulmonary angiography. We reported 30 days and 90 days readmission rate to be zero. One year mortality rate was 0.006 (n= 1) mortality due to COVID -19 illness. There were 6.02% (n=10) wound complications and no post operative infection.

Conclusion: Our study recommends the use of aspirin as extended thromboprophylaxis agent for TKA patients for 4 weeks after discharge from hospital in patients who recieved low molecular weight heparin (LMWH) for post operative in hospital period. It is safe and efficacious with no DVT/PE cases and minimum complications.

Keywords: Deep vein thrombosis, pulmonary embolism, acetyl salicylic acid, Low molecular weight heparin.

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INTRODUCTION

Osteoarthritis of the knee is a relatively common condition affecting approximately 10% of the general population above the age of 55 years. The increased life expectancy and the tendency for obesity in younger individuals have led to increased prevalence of the symptomatic knee osteoarthritis with broad variation among different population. There is no permanent cure but the prevailing treatment is aimed at reducing pain and improving joint function. The diagnosis is made clinically and then confirmed radiologically. Management is on individual basis and requires combination of treatment options which vary from non-pharmacological, pharmacological, surgery and arthroscopic debridement and lavage[1]

TKA is one of the most common and successful surgical interventions, providing substantial relief from pain and improvement in functional disability in patients with knee arthritis. TKA is surgical procedure re-surfacing the damaged knee with an artificial joint or prosthesis. The number of arthroplasties increases each year. Patients undergoing an arthroplasty are at risk of venous thromboembolism (VTE) including deep vein thrombosis (DVT) and pulmonary embolism (PE)[2]**.** In the absence of regular prophylactic therapy, the incidence of postoperative VTE is particularly high after arthroplasty surgery in Western countries. The incidence of DVT, which is detected by screening tests, varies from 42 to 57% after hip arthroplasty and from 41 to 85% after knee arthroplasty; the incidence of PE varies from 0.9 to 28% after hip arthroplasty and from 1.5 to 10% after knee arthroplasty[3]**.** In a recent review of published studies in Asian patients undergoing surgery, the adjusted incidence of VTE following joint arthroplasty surgery was 1.4%[4]**.**

Symptoms of DVT include pain, swelling, redness and enlarged veins in affected area but some DVTs have no symptoms. The most life threatening concern with DVT is potential for a clot to detach, travel through the right side of heart and become stuck in arteries that supply to the lungs. Both DVT and PE are considered as part of the same

overall disease process which is called VTE (venous thromboembolism). VTE can occur as an isolated DVT or PE with/without DVT. Although the incidence of DVT is very high, that of proximal DVT is low and that of fatal thromboembolism is very rare, this, along with concerns about efficacy and side-effects of various methods used for prophylaxis, has led to wide spread differences in opinion among orthopedic surgeons in using prophylaxis for DVT. Thus, the whole issue of prophylaxis for DVT is very controversial.

There are many chemical agents for VTE prophylaxis; there is a difference in their efficacy and the risk of bleeding. The choice of agent therefore relies on a balance between the desire to minimize VTE and the attempt to reduce the risk of bleeding, with its undesirable and occasionally fatal consequences. In the last 20 years, many studies reported in favour of LMWH over other anticoagulant factors. LMWH preparations have more predictable pharmacokinetic and pharmacodynamic properties, a longer half-life and a lower risk of non-haemorrhagic side effects[2]. Acetylsalicylic acid (ASA), which is generally known as aspirin, is an agent for the prevention of VTE following arthroplasty. Many studies have reported its efficacy in minimizing VTE following arthroplasty[2]**.**

The ninth edition of the ACCP guidelines, published in 2012, used different end points for the prevention of all VTEs, the risk for serious bleeding and mortality related to VTE and antithrombotic therapy. These strongly recommend the use of aspirin as an agent for VTE prophylaxis[3]**.** The American Association of Orthopedic Surgery (AAOS) guidelines (2007)[2] recommended aspirin as a potential pharmacological agent for VTE prophylaxis. The association between haematoma formation, persistent wound drainage and periprosthetic infection has also sensitized the orthopaedic community towards the use of less aggressive VTE prophylaxis, such as aspirin which minimizes the risk of these complications.

The present study will redefine the role of aspirin in VTE prophylaxis after TKA and establish it in Indian context also.

PATHOPHYSIOLOGY OF DVT

Deep vein thrombosis or deep venous thrombosis (DVT) is a blood clot in a deep vein. A clot inside a blood vessel is called a thrombus. DVT predominantly occurs in the legs. When symptoms are present for clots in the leg, the non-specific signs include pain, swelling, redness, warmness, and engorged superficial veins. The most serious complication is a life-threatening pulmonary embolism, the result of a thrombus detaching (embolizing) and travelling to the lungs. The disease term venous thromboembolism is used to refer to DVT and/or pulmonary embolism.

In 1856, the German pathologist Rudolph Virchow described three causes of venous thrombosis, now known as Virchow's triad: a decreased flow rate of the blood (venous stasis), an increased tendency of the blood to clot (hyper coagulability) and changes to the blood vessel wall[5]. DVT formation typically begins inside vein valves of the calves, where the blood is relatively oxygen-deprived, activating certain biochemical pathways.

Anticoagulation is the standard treatment for DVT; the typical medications are Low molecular weight heparin and vitamin K antagonist etc. Wearing graduated compression stockings appears to reduce the risk of post-thrombotic syndrome.

The disease term venous thromboembolism (VTE) includes both DVT and pulmonary embolism (PE). DVT can occur in lower extremities (from the legs), upper extremities (from the arms), abdominal or pelvic region. DVT in the legs is called proximal (or iliofemoral) when above the knee and distal (or calf) when below the knee. Distal DVT has limited clinical significance compared to proximal DVT. An incident DVT is an initial episode and any subsequent DVT is recurrent. DVT when extends, it "grows" in the direction of venous flow, towards the knees. When DVT does not grow, it can be cleared naturally and dissolved into the blood. DVT most commonly affects the leg veins of the thigh or lower leg such as the femoral vein, the popliteal vein, or the

iliofemoral vein. Extensive lower extremity DVT can reach into the iliac vein of the pelvis or the inferior vena cava.

DVT that has no symptoms, but is only found by screening, is labeled asymptomatic. Acute DVT is characterized by pain and swelling and is usually occlusive, which means they obstruct blood flow, whereas non occlusive DVT is less symptomatic. The label of chronic has been applied to symptomatic DVT that persists longer than 10 or 14 days. A DVT might also be called idiopathic when it "occurs in the absence of a known precipitating factor, such as oral contraceptives, surgery, trauma, or cancer.

RISK FACTORS FOR VTE [6]

- **Transient**
  - Major: surgery with general anesthesia >30 minutes, Confined to bed in hospital >3 days with an acute illness or caesarean section.
  - Minor: surgery with general anesthesia <30, admission to hospital <3days with an acute illness, estrogen therapy, pregnancy, confined to bed out of hospital >3 days with an acute illness, leg injury with reduced mobility.
  - Active cancer
  - Immobilization as in orthopedic casts in sitting position, and travel, particularly by air.
- **Permanent/persistent**
  - Active cancer
  - Chronic Inflammation
  - Chronic Autoimmune disease
  - Chronic infections
- **Non environmental**
  - Antithrombin deficiency
  - Protein C deficiency
  - Protein S deficiency
  - Factor V Leiden

- Prothrombin G20210A
- Male gender
- Old age

SIGNS AND SYMPTOMS OF DVT [6]:

Signs:

1. Tenderness
2. Homan's Sign
3. Tachycardia
4. Calf swelling
5. Pitting oedema

Symptoms:

1. Pain in the calf and thigh
2. Swelling
3. Warmth
4. Redness
5. Fever
6. Chest pain

DIAGNOSIS

Pre-test probability using a clinical decision rule

In primary care and in outpatients with suspected DVT, the Well's rule for DVT helps to calculate the pre-test probability of DVT and guide investigations. The Well's rule assigns points for clinical symptoms and risk factors for DVT to produce a total score between −2 and 9 points, which stratifies patients as "unlikely" (≤ 1 point) or "likely" (≥ 2 points) to have DVT[6]. A potential weakness is the need for clinicians to subjectively determine whether an alternative (non-DVT) diagnosis is likely or unlikely, as both groups require investigations. Among inpatients with suspected DVT, imaging is required because clinical decision rules have not been validated and D- dimer testing has a high frequency of false positive results.

Modified Well's Criteria for DVT[7]:

Modified Well's Criteria for DVT	
Active cancer	+1
Paralysis, paresis or recent plaster immobilization of lower extremities	+1
Recently bedridden for three days or major surgery within the last 12 weeks	+1
Localized tenderness along the deep venous system	+1
Entire leg swollen	+1
Calf swelling >3cm larger than asymptomatic side	+1
Pitting edema confined to symptomatic leg	+1
Collateral superficial veins	+1
Previously documented DVT	+1
Alternative diagnosis as likely as DVT	-2
Clinical probability of DVT	
Likely	>2
Unlikely	<2

Modified Well's Criteria For PE[8]**:**

Modified Well's Criteria For Pulmonary Embolism	
Clinical signs and symptoms of DVT	3
PE is #1 Diagnosis or equally likely	3
Heart rate >100?	1.5
Immobilization at least 3 days or surgery in previous 4 weeks previous objectively diagnosed PE or DVT	1.5
Hemoptysis	1
Malignancy with treatment within 6 months or palliative	1
Patient has none of these	0
Clinical probability of PE	
PE likely	>4
PE unlikely	<4

D-dimer testing

D-dimer levels are raised in most patients with DVT (sensitivity, 94–96%) and also in older patients and in patients with malignancy, sepsis, inflammation, chronic kidney failure, recent surgery, trauma, severe burns, and pregnancy (specificity, 42–52%)[9, 10]. Therefore, a negative D-dimer result helps exclude DVT, particularly when the clinical probability is low, and a positive D-dimer result requires imaging to confirm DVT. D-dimer testing may also be used to predict the risk of recurrent VTE after ceasing anticoagulation [10].

Diagnostic imaging

Venous compression ultrasound (CUS) is the first-line imaging test for suspected DVT[10]. There are two acceptable strategies. The first is CUS limited to the proximal leg (thigh and popliteal region) to diagnose proximal DVT, and repeat one week later to assess for distal DVT extending proximally. The second is CUS of the whole leg which, if negative, avoids the need for a repeat limited CUS, but may diagnose distal DVTs that may not require anticoagulation. The risk of missing a DVT in the first 3 months after a negative whole leg CUS is less than 2%.Compared with venography, CUS has a sensitivity of 93.8% and specificity of 97.8% for proximal DVT.

AGENTS FOR DVT PREVENTION

Mechanical VTE prophylaxis

The mechanical methods for VTE prophylaxis include mobilization, graduated compression stockings (GCS), intermittent pneumatic compression device (IPCD) and venous foot pumps (VFP). Advantages of mechanical VTE prophylaxis include the lack of bleeding potential, no need for laboratory monitoring and no clinically important side effects[11,12]. Furthermore, the effectiveness of anti-coagulants may be enhanced by some mechanical methods.[13,14] Disadvantages of mechanical VTE prophylaxis methods include the difficulty of implementation or suboptimal compliance issues due to limited movement of the patient and discomfort they may bring [11, 12]. They need to be worn continuously pre-, intra-and post-operatively for 72 hours, and lack of powerful evidence that any of the

mechanical VTE prophylaxis methods may reduce the risk of death or PE[13]. Concerning GCS, these need to be sized and fitted properly, while it has been reported that they can cause impairment in tissue oxygenation**.** Additionally, situations such as open fractures, peripheral arterial insufficiency, severe cardiac insufficiency, infection and ulceration of the lower limbs are contraindications for the use of mechanical VTE methods[12,15]. VTE prophylaxis in combination with motor physical therapy can be associated with early return to the community, shorter hospitalization time, fewer complications and lower six-month mortality[16,17].

It is important to note that the majority of hospital associated symptomatic VTE events occur after patients have started to ambulate. Therefore, mobilization alone does not provide adequate VTE prophylaxis for hospitalized patients and should often be regarded with caution[18].

The latest available guidelines from the ACCP (2012)[19] suggest the use of mechanical methods in addition to pharmacological prophylaxis during hospitalization in patients with high risk for VTE after major orthopedic surgery.

Pharmacologic VTE prophylaxis

The options for include aspirin, unfractionated heparin (UFH), low molecular weight heparin (LMWH), adjusted dose vitamin K antagonists (VKA), synthetic pentasaccharide factor Xa inhibitor (Fondaparinux) and newer oral anticoagulants.

Aspirin

Aspirin (acetylsalicylic acid) is an inexpensive, orally administered and widely available medication with a controversial use as a prophylactic agent for VTE. In 2008, ACCP guidelines clearly recommended against the use of aspirin alone as VTE prophylaxis for any patient group, and for any orthopaedic patient**.** However, the 2012 ACCP guidelines recommends the use of aspirin as VTE prophylaxis for patients undergoing THA, TKA or hip fracture surgery because it appeared that the use of aspirin for VTE prophylaxis in these patients is more effective compared with placebo[18,19]. Nevertheless, in the same

guidelines, the use of LMWH in preference to the other recommended agents including aspirin is concluded.[19]

The AAOS, following an update in 2011, recognized that the evidence base for the optimal pharmacotherapy for VTE was insufficient.[20-22]

The SIGN guidelines (2010, updated in 2015) are clearer about aspirin. According to SIGN 'as other agents are more effective for prevention of VTE, aspirin is not recommended as the sole pharmacological agent for VTE prophylaxis in orthopaedic patients'[23].

According to a meta-analysis in 2016, although aspirin is a suitable therapy for the prevention of VTE in THR and TKR, as recommended by the ACCP and AAOS, the evidence available is of limited quality and still remains unclear about the dosage and duration of administration of aspirin for VTE prophylaxis. Overall, it seems that the use of aspirin as a VTE prophylaxis agent in orthopedic patients remains controversial[24].

Vitamin K antagonists (VKA's)

VKA are a group of oral anticoagulants whose anticoagulation effect is produced by interfering with the cyclic interconversion of Vitamin K and its 2,3 epoxide, thereby modulating the γ-carboxylation of glutamate residues (Gla)[25]. Two common VKA drugs are and warfarin[25]. The use of VKAs requires monitoring and the most common way to monitor a VKA therapy is the prothrombin (PT) test. This test provides information about PT activity through the measurement of the International Normalized Ratio (INR)[12,25].

VKAs are recommended by the latest ACCP guidelines for VTE prophylaxis in patients undergoing THA, TKA or hip fracture surgery**.** There are series of guidelines from articles published in CHEST providing suggestions for the monitoring of a patient treated with a VKA[19,25-27]. A therapeutic INR range of 2.0 to 3.0 with a target INR of 2.5 is recommended rather than a lower or higher range. For patients under VKA therapy with consistently stable INR, an INR testing frequency of up to 12 weeks has been recommended. When warfarin is administered, an initial effect on INR usually occurs within the first two to three days. Consequently, when a rapid anticoagulant effect is

required, heparin or LMWH should be administered concurrently. This administration should be overlapped for at least two days with warfarin until INR reaches the therapeutic range to allow for further reduction of factors X and II[25- 27].

Unfractionated heparin

UFH is a heterogeneous mixture of glycosaminoglycans that binds to antithrombin (AT) and catalyses the inactivation of thrombin, factor Xa and other clotting enzymes. The heparin/AT complex inactivates thrombin (factor IIa) and factors Xa, IXa, XIa and XIIa[28]. The two preferred administration routes are subcutaneous and continuous intravenous (IV) infusion[29]. The subcutaneous administration is associated with reduced bioavailability and therefore a higher dose compared with IV administration is required. If an immediate anticoagulation effect is needed, an IV bolus injection of heparin could accompany the initial subcutaneous administration. The use of UFH may lead to haemorrhagic complications; this risk increases with the amount of dose and concomitant administration of fibrinolytic agents or glycoprotein IIb/IIIa inhibitors[30-32]. Additionally, recent surgery, trauma, invasive procedures or concomitant haemostatic defects increase the risk of bleeding. Because anticoagulant response varies among patients, monitoring UFH with tests and adjusting the dose is a standard practice. UFH is recommended by the latest ACCP guidelines for VTE prophylaxis in patients undergoing THA, TKA or hip fracture surgery. When administered in therapeutic doses, the anticoagulant effect of UFH is usually monitored using the activated partial thromboplastin time (aPTT or APTT)[19,28]. However, the anticoagulant effects of the UFH can rapidly be reversed with the use of IV protamine sulphate; 1 mg of protamine sulphate will neutralize approximately 100 IU of UFH. UFH may also lead to non-haemorrhagic side effects, such as heparin-induced thrombocytopenia (HIT) and osteoporosis[28,33,34].HIT is associated with the formation of anti-heparin antibodies/platelet factor, thrombocytopenia and pro-thrombotic effect that may contribute to haemorrhage, thrombosis and embolism, and may lead to death. If thrombocytopenia occurs, alternative

anticoagulation should be used until HIT is excluded. If any suspicion of HIT, UFH should be suspended immediately.

Low molecular weight heparin (LMWH)

LMWH is derived from UFH by chemical or enzymatic depolymerization. Their molecular weight is approximately one-third that of UFH (mean, 4000 to 5000 D; range, 2000 to 9000 D). Compared to UFH, LMWH has a more favourable benefit-to-risk ratio in animal models, with superior pharmacokinetic properties. The inhibitory activity of LMWH against factor Xa is greater than thrombin and exhibits less binding to cells and proteins than UFH. Consequently, LMWH preparations have more predictable pharmacokinetic and pharmacodynamic properties, a longer half-life and a lower risk of non-haemorrhagic side effects than UFH. LMWH is administered subcutaneously via injection, in one or two daily doses without the need of monitoring. [28,30]

Over the last 20 years, many studies reported in favour of LMWH over other anticoagulant factors[35-40]. According to Palmer et al[35], 'in orthopaedic surgery, LMWH is significantly superior to both UFH and warfarin for prevention of DVT, and results in significantly less minor bleeding complications when compared to UFH, but significantly more minor bleeding when compared to warfarin'. Howard et al[36] reported that 'LMWH is more efficacious than either adjusted dose of UFH or warfarin, when used to prevent DVT and proximal DVT following TKA'. Other studies supported that LMWH is better for DVT prophylaxis in TKA compared with warfarin or aspirin[37,38]. Handoll et al [39] reported that LMWH and UFH are similarly effective in preventing DVT after hip fracture surgery. An uncommon but potentially devastating complication of anticoagulation with LMWH is HIT syndrome, as reported with UFH. The absolute risk for HIT with LMWH was 0.2%, compared with 2.6% with UFH. The latest ACCP guidelines recommended LMWH as an optimal method for VTE prophylaxis in patients undergoing THA, TKA or hip fracture surgery[19]. Due to these characteristics, LMWH should be considered as the gold standard for VTE prophylaxis in orthopedic patients.

Fondaparinux

Fondaparinux is a synthetic pentasaccharide with a molecular weight of 1728 D, a specific anti-Xa activity that is higher than that of LMWH and a half-life that is longer than LMWH. After subcutaneous injection, there is a rapid and complete absorption of fondaparinux. A steady state is reached after the third or fourth once-daily dose. Pharmacologically, fondaparinux produces a conformational change of antithrombin that enhances its reactivity with factor Xa. For the treatment of DVT or PE, fondaparinux is given at a dose of 7.5 mg for patients with a body weight of 50 to 100 kg; the dose is decreased to 5 mg for patients[29]. A benefit of fondaparinux over other injectable agents such as UFH and LMWH is that it does not inactivate thrombin (factor IIa), has no effect on the platelets and does not cross-react with serum of patients with HIT[12].A 2007 study with a total inclusion of > 144000 patients reported a lower incidence of VTE with fondaparinux (1.5%) compared with enoxaparin (2.3%), dalteparin (2.1%) and UFH (4.2%). Also, the latest ACCP guidelines recommend fondaparinux as a method of VTE prophylaxis for patients undergoing THA, TKA or hip fracture surgery. However, the same guidelines report that close balance between desirable and undesirable effects makes the use of fondaparinux for extended VTE prophylaxis less appealing, particularly compared with LMWH[31,32].

Newer oral anticoagulants

Compared with VKAs, newer oral anticoagulant drugs have an advantage of the ability to administer at fixed doses without the need of laboratory monitoring. Subsequently, they have the potential to overcome several drawbacks of VKAs[41].

Rivaroxaban

Rivaroxaban is an orally administered direct inhibitor of activated factor X (Xa). It was found to be more effective than enoxaparin in preventing VTE after THA or TKA in phase III clinical trials. Rivaroxaban is administered in a fixed daily oral dose of 10 mg for VTE prophylaxis after elective THA and TKA. [42] The latest ACCP guidelines recommend rivaroxaban as a method of VTE prophylaxis in patients

undergoing THA and TKA. However, the same guidelines report that rivaroxaban has not been evaluated in hip fracture surgery[19]. Therefore, rivaroxaban is currently not recommended for hip fracture surgery.

Dabigatran

Dabigatran is a selective, reversible, direct thrombin inhibitor given orally. Phase III clinical studies evaluated the use of dabigatran for VTE prophylaxis after elective THA and TKA, for the treatment of VTE, and for the prevention of systemic embolism in non-valvular atrial fibrillation. The drug has been approved in many countries for VTE prophylaxis in patients undergoing THA or TKA. Its efficacy was analysed in studies that compared dabigatran with enoxaparin in patients undergoing THA or TKA[41]. Both studies reported that dabigatran was as effective as enoxaparin for VTE prophylaxis. For VTE prophylaxis, the dosing schedules of dabigatran are 150 mg and 220 mg daily, starting with a half dose given soon after surgery[41].

In 2012, Uchino et al[43] reported an association of dabigatran with an increased risk of myocardial infarction or acute coronary syndrome in broad spectrum of patients when tested against different controls. Nevertheless, the latest ACCP guidelines recommend dabigatran as a method of VTE prophylaxis in patients undergoing THA or TKA. However, the same guidelines report that dabigatran has not been evaluated in hip fracture surgery[19]**.** Therefore, dabigatran is currently not recommended for hip fracture surgery.

Apixaban

Apixaban is a direct factor Xa inhibitor that has been approved for VTE prophylaxis following THA and TKA, for the treatment of acute DVT or PE[44]**.**There are studies that compared the efficacy of apixaban versus enoxaparin that led to the approval of apixaban for VTE prophylaxis[45]**.** The current recommended dosage for VTE prophylaxis after THA and TKA is 2.5 mg twice daily starting 12 to 24 hours after surgery.[44].

The latest ACCP guidelines recommend apixaban as a method of VTE prophylaxis in patients undergoing THA or TKA**.** However, apixaban is currently not recommended for hip fracture surgery[19].

Orthopaedic patients are at higher risk among all patients for DVT and VTE. In the early 2000s, despite the existence of VTE prophylaxis guidelines, the use of VTE prophylaxis was low**.** Currently, the adherence to in-hospital American College of Clinical Pharmacy (ACCP) guidelines, especially for orthopaedic patients, seems to be increasing[46-49]. There has been an increasing understanding that in the absence of the pathophysiologic processes included in Virchow's triad, VTE is not usually developed**.** In an orthopaedic patient undergoing an operation, all of the above pathophysiologic processes included in Virchow's triad are present: 1) use of tourniquet, immobilization and bed rest cause venous blood stasis; 2) surgical manipulations of the limb cause endothelial vascular injuries; 3) trauma increases thromboplastin agents; and 4) use of polymethylmethacrylate (PMMA) bone cement increases hypercoagulability.[49] Therefore, in patients undergoing orthopaedic surgery VTE prophylaxis is required.

There have been many reported risk factors for VTE and recurrent VTE. According to SIGN(2010)[48]: 1) risk factors for VTE include age, obesity, varicose veins, family history of VTE, thrombophilias, combined oral contraceptives, hormone replacement therapy, anti-oestrogens, pregnancy, puerperium, immobility, immobility during travel, hospitalization, anaesthesia and central venous catheters; and 2) risk factors for recurrent VTE include previous unprovoked VTE, male sex, obesity and thrombophilias**.** According to Anderson et al[48]: 1) strong risk factors for VTE include a fracture of the hip or leg, hip or knee replacement, major general surgery, major trauma and spinal cord injury (SCI); 2) moderate risk factors include arthroscopic knee surgery, central venous catheters, chemotherapy, congestive heart or respiratory failure, hormone replacement therapy, malignancy, oral contraceptive therapy, paralytic stroke, pregnancy/postpartum, previous VTE and thrombophilias ; and 3) weak risk factors include bed rest > 3 days, immobilization and bedridden, increasing age, laparoscopic surgery, obesity, pregnancy/antepartum and varicose veins[50].

Risk stratification for VTE in surgical patients without prophylaxis classifies orthopaedic patients at the highest risk. The ACCP (2008) [18] classified in-hospital patients without VTE prophylaxis into three categories (low, moderate and high risk). In the first category, patients who are fully mobile and those who are mobile and undergoing minor surgery are classified as having < 10% risk. In the second category, most general surgery patients, open gynaecologic or urologic surgery patients, and medical patients who are bedridden or sick are classified as having a 10% to 40% risk. In the third category, the average orthopedic patients who have undergone hip or knee arthroplasty or sustained a hip fracture, major trauma or SCI are included**.** Randomized clinical trials have concluded that the rates of proximal DVT 7 to 14 days after major orthopaedic surgery in patients who did not receive any VTE prophylaxis are approximately 40% to 60% and 10% to 30%, respectively[18]. After discharge from hospital, these orthopaedic patients are still at risk for VTE. Hypercoagulability can persist for six weeks after a hip fracture, while venous function remains significantly impaired for up to 42 days following hip fracture surgery. VTE can occur up to three months after TKA and THA and is the most common cause for readmission after total hip replacement (THA)[18]. According to Planes et al[51], 20% of THA patients with negative venogram at discharge and no VTE prophylaxis had a new DVT that developed over subsequent three weeks based on repeat venogram. Also, approximately 30% of patients who experienced a DVT may experience recurrent DVT within 8 to 10 years after initial diagnosis and treatment.

There are various reasons for the popularity of aspirin as a prophylactic agent. Besides the proven efficacy, it is inexpensive and well tolerated, and its use does not require routine blood monitoring. It is also a ‘milder’ agent that is unlikely to result in haematoma formation, which may require further surgery, and increase the risk of infection[52-56]. Aspirin is also less likely to be associated with persistent wound drainage, with all its undesirable consequences, than agents such as

low-molecular-weight heparin (LMWH) or other more aggressive agents[52,55,57,58].

One may relate to the advances in anaesthesia and surgical techniques that have changed the nature of arthroplasty. The use of regional anaesthesia, multimodal pain management with less reliance on opioids allows most patients to walk within hours of their surgery, unlike in the recent past, when patients would be unable to walk for several days after the operation[59]. Many centres around the world now undertake arthroplasty as an outpatient procedure. The increasing use of pre-operative training and exercise classes allows faster mobilisation after surgery[60-62]. The fact that an arthroplasty is more routine and predictable procedure means that patients present earlier for surgery and are therefore more mobile pre-operatively.

There has been shift towards aspirin due to cost containment. Also healthcare providers may have to bear the costs of complications and re-admissions, which encourage strategies that minimise wound-related problems. The association between haematoma formation, persistent wound drainage and periprosthetic infection has also sensitised the orthopaedic community towards the use of less aggressive VTE prophylaxes, such as aspirin, that minimise the risk of these complications[47,63,64]. It means that the balance of risk and cost is now relatively more in favour of techniques that reduce infection. Some European guidelines, such as the Scottish Intercollegiate Guidelines Network (SIGN) and the National Institute for Health and Care Excellence (NICE), dispute its efficacy[23]. The committees that guide the formation of guidelines may receive evidence from experts in haematology, internal medicine and other subspecialties, who question the efficacy of aspirin as an antithrombotic agent.

The main objective of our study is to summarise the current evidence relating to the efficacy of aspirin as VTE prophylaxis following arthroplasty,

Mode of action of aspirin

Aspirin irreversibly inhibits the activity of cyclooxygenase (COX) in platelets. COX-1 and 2 isoenzymes catalyse the conversion of

arachidonic acid to prostaglandin (PG) H2 and the production of thromboxane A2 (TXA2) and PGI2[64]. TXA2 induces vasoconstriction, whereas PGI2 induces vasodilatation and inhibits the aggregation of platelets[65]**.** It exerts its activity by inhibiting COX-1, which in turn inhibits the production of TXA2. The action of aspirin is not limited to arterial circulation. It inhibits platelet aggregation**,** an important instigator of venous thrombosis. Besides COX-1 inhibition, several mechanisms have been proposed for the antithrombotic action. It suppresses the activation and aggregation of platelets via non-cyclooxygenase-1 pathways[66] It also attenuates the generation of thrombin by the acetylation of antithrombin III and prothrombin, decreasing tissue factor expression on monocytes and macrophages and impairing the formation of prothrombinase on platelets with reduced activation of factor V[67]. Aspirin acetylates fibrinogen and fibrin and inhibits the activation of thrombin-mediated factor XIII, resulting in formation of looser networks of fibrin with increased lysability. The efficacy of aspirin in the prevention of VTE includes its ability to reduce the incidence of both proximal and distal DVTs, and non-fatal and fatal PEs. The Pulmonary Embolism Prevention trial showed the efficacy of aspirin in preventing PE[68]. This multinational and prospective study, involving more than 24,000 patients, confirmed the efficacy of aspirin in the prevention of VTE for patients undergoing arthroplasty. The use of aspirin reduced the incidence of PE and DVT post-operatively by at least one third. The study concluded that “there is now good evidence for considering aspirin routinely in a wide range of surgical and medical groups at high risk of VTE”. The publication of many further studies showing the same thing resulted in the ACCP endorsing aspirin with the highest grade of recommendation, and for the AAOS to accept aspirin as prophylaxis for patients undergoing arthroplasty.

The Aspirin for the prevention of Recurrent Venous Thromboembolism Warfarin and Aspirin (WARFASA) trial[69] showed that in patients with an initial unprovoked VTE (n = 403) who had completed six to 18 months of treatment with vitamin K antagonists and then were assigned to aspirin (100 mg/day) for two years, VTE recurred in 6.6%

of those receiving aspirin compared with 11.2% of those receiving a placebo (p = 0.02). In a study by Paul A. Gurbel et al[70] concluded that Aspirin may exert antiplatelet properties through non-cyclooxygenase-1 pathways.

The initial AAOS guidelines on VTE prevention advised the use of aspirin 325 mg twice daily with a 1C grade for the recommendation, acknowledging the lack of sufficient studies on the optimal dose[71]. The reason for using this dose is that 325 mgs is equivalent of five grains, which was the original dose. A meta-analysis in the cardiology literature showed that high doses of aspirin (500 to 1500 mg/day) were no more effective than medium doses (160 to 325 mg/day) or low doses (75 to 150 mg/day). Further studies have also shown that high doses of aspirin were associated with more gastrointestinal side effects[72]. There are equally many other studies showing the efficacy of low dose aspirin in minimising VTE, and a lower incidence of gastrointestinal bleeding than with the higher doses[68]. The PEP trial evaluated the efficacy of low dose aspirin (160 mg/day). The relevant literature includes studies evaluating a wide range of doses of aspirin as VTE prophylaxis with doses of 75 mg, 81 mg, 100 mg, 150 mg, 160 mg, 162 mg, 250 mg, 300 mg, 325 mg, 600 mg, 650 mg, 1200 mg, 1300mg, 3600 mg[2]**.** It has been shown that aspirin at doses between 30 mg and 150 mg is sufficient to inhibit platelet COX-1 function. A recent cross-over study at the Rothman Institute showed that low dose aspirin (81 mg twice a day) was as effective as a higher dose (325 mg twice a day). The recommendation of that study was that low dose aspirin should be used for the prevention of VTE following arthroplasty[72] .

The initial AAOS guidelines on the prevention of VTE, published in 2007, recommended that aspirin prophylaxis should continue for six weeks after an arthroplasty**.** The recent ACCP guidelines, on the other hand, recommended that aspirin prophylaxis should only be continued for ten to 14 days after arthroplasty, with the recommendation having strong evidence (Grade 1B), but also suggesting extended prophylaxis for 30 to 35 days with weak evidence (Grade 2C)[71]. A recent study

showed that most symptomatic VTEs (94%) occur within two weeks of an arthroplasty, with 89% occurring within the first week**.** Based on this study and the recommendations of the ACCP, it is plausible that the administration of aspirin for two weeks following an arthroplasty may usually be sufficient. Since some studies have shown that the risk of VTE remains higher than the general population after an arthroplasty, the use of extended prophylaxis, particularly in high-risk patients may also be reasonable[73]. Aspirin is safe and causes fewer complications than other chemical agents available for VTE prophylaxis. Adverse events are rare with the use of aspirin. At higher doses it cause dyspepsia, gastroesophageal reflux, and an increased risk of upper gastrointestinal bleeding. Aspirin can also induce small and large bowel pathology (enteropathy). Patients developing adverse events related to the administration of aspirin, should discontinue its use[72]. Any prophylaxis given to patients for the prevention of VTE carries potential for unintended effects.

The administration of aspirin as VTE prophylaxis may also carry some unintended beneficial events. It has recently been shown that the incidence of mortality after arthroplasty is lower in patients using aspirin than in those using warfarin[74] ,LMWH, ximelagatran, fondaparinux, or rivaroxaban. Hunt et al[75] showed that mechanical and chemical thromboprophylaxis with heparin with or without aspirin were associated with a decreased 90-day mortality in 4,09,096 patients undergoing primary THA. They also reported that the 45-day mortality with aspirin after TKA was slightly lower than the mortality with heparin. The latter is not surprising as myocardial infarction and not PE is the main cause of mortality following arthroplasty. PE is responsible for 11.7% to 17.1% of 90-day mortality[76], while a myocardial infarction is responsible for 25.9%. The use of aspirin does not require blood tests (like warfarin) that can delay discharge from hospital until target therapeutic levels are obtained. Aspirin has anti-inflammatory properties that may aid rehabilitation and the return of function. Keyas et al[77] compared the effects of aspirin and LMWH on early return of movement of the knee after TKA and found that movement returned

faster in the aspirin group. An early discharge from hospital for patients on aspirin may relate to the lower incidence of wound-related complications.The fourth and eighth editions of the American College Of Chest Physicians (ACCP) guidelines, published in 2004 and 2008, respectively, recommended against the use of aspirin for VTE prophylaxis in patients undergoing arthroplasty[18]. The ninth edition of the ACCP guidelines, published in 2012, used different end points for the prevention of all VTEs, the risk for serious bleeding and mortality related to VTE and antithrombotic therapy. These strongly recommend (Grade 1B) the use of aspirin as an agent for VTE prophylaxis[19].

In the United Kingdom, NICE produced guidelines in 2010 that were similar to the eighth edition of the ACCP guidelines[78].Other important orthopaedic organisations in the United Kingdom, such as the British Hip Society, accept the use of aspirin for VTE prophylaxis. Despite the NICE guidelines, some surgeons in the United Kingdom continue to use aspirin. In a similar way to the change in the ACCP guidelines, it may be that NICE will change its evidence base and endpoints for the evaluation of the efficacy of aspirin used in this way.In 2007, the American Academy of Orthopedic Surgeons (AAOS) issued a guideline focused on the prevention of symptomatic rather than asymptomatic VTE. This recommended aspirin 325 mg twice daily for six weeks for patients at standard risk of PE and major bleeding, those with a standard risk of PE and elevated risk of major bleeding, and those with an elevated risk of PE and major bleeding groups separately[79].In 2009, the AAOS released a guideline document focused on prevention of symptomatic pulmonary embolism in patients undergoing THA and TKA[20] .Aspirin was indicated as antithrombotic prophylaxis in patients undergoing total hip or knee arthroplasty. This recommendation was mainly based on the results of the Pulmonary Embolism Prevention study[68] Aspirin reduced the incidence of pulmonary embolism and of deep vein thrombosis in patients with hip fracture surgery. Fatal pulmonary embolism was reduced by 58%.

AIMS AND OBJECTIVES

To study the role of aspirin in prevention of venous thromboembolism (VTE) following total knee arthroplasty(TKA).

REVIEW OF LITERATURE

Alexander J. Rondon et al[79] in 2019 published a study which retrospectively reviewed 31,133 patients who underwent primary TJA from 2000 to 2017. Patients were allocated into 2 cohorts on the basis of the VTE prophylaxis administered: aspirin (25.9%, 8,061 patients) and non-aspirin (74.1%, 23,072 patients). Mortality was assessed with use of an institutional mortality database that was updated biannually. The use of aspirin was independently associated with lower risk of death at both 30 days. Patients in the non-aspirin cohort showed 3 times the risk of death at 30 days compared with the aspirin cohort and twice the risk of death at 1 year. The study demonstrated the use of aspirin as prophylaxis against VTE following TJA and may reduce the risk of mortality. Given the numerous options available and permitted by the current guidelines, orthopaedic surgeons should be aware of the potential added benefits of aspirin when selecting a VTE-prophylactic agent.

Gulraj S. Matharu et al[80] in 2020 performed a systematic review and meta-analysis of randomized clinical trials (RCTs), with no language restrictions, from inception to September 19, 2019, using MEDLINE, Embase, Web of Science, Cochrane Library, and bibliographic searches. This study included RCTs assessing the effectiveness and safety of aspirin for VTE prophylaxis compared with other anticoagulants in adults undergoing THA and TKA. The risk of adverse events, including major bleeding, wound hematoma, and wound infection, was not statistically significantly different in patients receiving aspirin vs other anticoagulants. When analyzing THAs and TKAs separately, there was no statistically significant difference in the risk of VTE, DVT, and PE between aspirin and other anticoagulants. Aspirin had a VTE risk not statistically significantly different from low-molecular-weight heparin or rivaroxaban .In terms of clinical effectiveness and safety profile, aspirin did not differ statistically significantly from other anticoagulants used for VTE prophylaxis after THA and TKA. Aspirin was effective for VTE prophylaxis and that

aspirin had a similar or slightly improved effectiveness and safety profile compared with other commonly used anticoagulants. Therefore, current evidence supports the continued use of aspirin in VTE prophylaxis after THA and TKA.

YI Zeng et al[81] in 2018 conducted a study of 17,660 patients (20,078 hips and knees) undergoing THA and TKA at 78 hospitals**.** The aim was to determine the real incidence of symptomatic in-hospital venous thromboembolism (VTE) and to identify risk factors for VTEs in Asian patients undergoing total hip arthroplasty (THA) and total knee arthroplasty (TKA).The composite incidence of symptomatic in-hospital DVT and PE was identified as the primary effectiveness outcomes. The incidence of symptomatic VTEs in Asian regions was low compared with that reported in studies targeting Western populations. Approximately 1 in 500 patients undergoing THA and approximately 1 in 300 patients undergoing TKA developed symptomatic VTEs prior to hospital discharge. Old age, high BMI, history of venous thromboembolism, hypertension, cerebrovascular disease, and no medication prophylaxis were risk factors identified in this study.

Brandon R Hood et al[82] in 2018 conducted a non inferiority study of a retrospective cohort of TKA cases submitted to the Michigan Arthroplasty Registry Collaborative Quality Initiative at 29 member hospitals, ranging from small community hospitals to large academic and non-academic medical centers in Michigan. The study included 41 537 patients who underwent primary TKA between April 1, 2013, and October 31, 2015. Clinical events were monitored for 90 days after surgery. Data was analyzed between September and October 2016. The method of pharmacologic prophylaxis: neither aspirin nor anticoagulants for 668 patients (1.6%), aspirin only for 12,831 patients (30.9%), anticoagulant only (eg, low-molecular-weight heparin, warfarin, and Xa inhibitors) for 22,620 patients (54.5%), and both aspirin/anticoagulant for 5,418 patients (13.0%). Most patients were also using intermittent pneumatic compression stockings. A VTE event occurred in 573 of 41,537 patients (1.38%); 32 of 668 (4.79%) who received no pharmacologic prophylaxis, 149 of 12,831 (1.16%) treated

with aspirin alone, 321 of 22,620 (1.42%) with anticoagulation alone, and 71 of 5,418 (1.31%) prescribed both aspirin and anticoagulation. Aspirin only was non inferior for the composite VTE outcome compared with those receiving other chemoprophylaxis .Bleeding occurred in 457 of 41,537 patients without prophylaxis, 116 of 12,831 (0.90%) in the aspirin group, 258 of 22,620 (1.14%) with anticoagulation, and 73 of 5,418 of those receiving both. Aspirin alone was also non-inferior for bleeding complications. Aspirin alone may provide similar protection from postoperative VTE compared with other anticoagulation treatments.

Sinan Nadi et al[83] in 2019 conducted a systematic review to identify relevant randomized controlled trials. Studies comparing enoxaparin, aspirin and/or placebo for VTE prophylaxis in THA or TKA patients were included. Nine randomized controlled trials were eligible for inclusion. The NMA found no statistically significant differences for the investigated outcomes: total DVT rates, symptomatic pulmonary embolism, major haemorrhage and wound complications. The occurrence of PE was rare. Due to limited data, sub-group analysis was not possible. This review did not find statistically significant differences between aspirin and enoxaparin.

Robert P Runner et al[84] in 2018 queried the American Board of Orthopedic Surgery case database utilizing Current Procedural Terminology codes 27447 and 27130 for primary total knee and hip arthroplasty, respectively. Geographic region, patient age, gender, deep vein thrombosis prophylaxis strategy, and complications were obtained. Less aggressive prophylaxis patterns were considered if only aspirin and/or sequential compression devises were utilized. More aggressive VTE prophylaxis patterns were considered if any of low-molecular-weight heparin (enoxaparin), warfarin, rivaroxaban, fondaparinux, or other strategies was used. In total, 22,072 cases of primary joint arthroplasty were analyzed from 2014 to 2016. The national rate of less aggressive VTE prophylaxis strategies was 45.4%, while more aggressive strategies were used in 54.6% of patients. Significant regional differences in prophylactic strategy patterns exist

between the 6 regions. The predominant less aggressive prophylaxis pattern was aspirin with sequential compression devises at 84.8% with 14.8% receiving aspirin alone. Use of less aggressive prophylaxis strategy was significantly associated with patients having no complications (95.5% vs 93.0%). Use of more aggressive prophylaxis patterns was associated with higher likelihood of mild thrombotic (0.9% vs 0.2%), mild bleeding (1.3% vs 0.4%), moderate thrombotic (1.2% vs 0.4%), moderate bleeding (2.7% vs 2.1%), severe thrombotic (0.1% vs 0.0%), severe bleeding events (1.2% vs 0.9%), infections (1.9% vs 1.3%), and death within 90 days (0.7% vs 0.3%). Similar results were found in subgroup analysis of total hip and knee arthroplasty patients. It was not possible to ascertain the individual rationale for use of more aggressive VTE prophylaxis strategies; however, more aggressive strategies were associated with higher rates of bleeding and thrombotic complications. Less aggressive strategies were not associated with a higher rate of thrombosis.

Shawn S Richardson et al[85] in 2019 used a national private insurance database to identify patients undergoing unilateral TKA. Patients with a prior history of VTE were excluded. Anticoagulants included ASA, low molecular weight heparin (LMWH), warfarin, factor Xa inhibitors (XaI), and fondaparinux. Postoperative complications, including VTE, blood transfusion, myocardial infarction, and hematoma, were identified using ICD-9 diagnosis codes. Risk of each complication was compared between groups using multivariate logistic regression controlling for demographics, length of stay, and comorbidities. Of 30,813 patients, 1.82% were diagnosed with VTE. Using ASA as a baseline, there was significantly decreased risk of VTE with LMWH, XaI and fondaparinux . There was significantly higher risk of transfusion with LMWH and fondaparinux, but no difference in hematoma between medications. This study shows that there is a decreased risk of VTE with LMWH, XaI, and fondaparinux compared to ASA. However, these medications also had higher rates of bleeding- associated complications. The choice of pharmacologic prophylaxis should be made based on a balance of the risk/benefit profile of each medication

Mhamad Faour et al[86] in 2018 conducted a study. The aim of the study was to compare two aspirin regimens with regard to the incidence of: 1) symptomatic deep venous thrombosis (DVT), 2) pulmonary embolism (PE), 3) bleeding, and 4) mortality within 90 days following TKA. The study retrospectively identified 5,666 patients who received aspirin twice daily (BID) for 4 to 6 weeks following TKA. A total of 1,327 patients received 81-mg BID and 4,339 patients received 325-mg BID aspirin. Postoperative complications collected were: VTEs (DVT and PE), bleeding (gastrointestinal or wound bleeding) and mortality .The incidence of VTE was 0.5% in 325-mg group and 0.7% in 81-mg group. Symptomatic DVT was 1.4% in the 325-mg aspirin compared to 0.3% for 81-mg aspirin. After accounting for confounders, regression model showed no correlation between aspirin dose and VTE incidence .The incidence of PE was 0.2% in high- compared to 0.4% in low- aspirin. Bleeding was 0.2% in 325-mg aspirin and 0.2% in 81-mg aspirin and 90-day mortality was similar (0.1%) between the groups. Low-dose aspirin was not inferior to high-dose aspirin for the prevention of VTE after TKA. Low-dose aspirin can be considered safe and effective agent in the prevention of VTE after TKA.

National Institute For Health And Care Excellence guidelines (NICE) 2018[87] concluded to Offer VTE prophylaxis to people undergoing elective knee arthroplasty surgery whose VTE risk outweighs their risk of bleeding. Choose any one of: Aspirin (75 or 150 mg) for 14 days or LMWH for 14 days combined with anti-embolism stockings until discharge. Rivaroxaban, within its marketing authorisation, is recommended as an option for the prevention of venous thromboembolism in adults having elective total hip replacement surgery or elective total knee replacement surgery.

Harpreet Bawa et al[88] in 2018 analysed a total of 369,483 patients, of which 239,949 patients had prescription medication claims. Warfarin was the most commonly prescribed anticoagulant. Patients with a hypercoagulable diagnosis had markedly more DVTs within 6 months after THA or TKA. More patients with a hypercoagulable diagnosis were treated with warfarin or lovenox than other types of

anticoagulants. A multivariate regression analysis was performed, showing that patients prescribed aspirin, fondaparinux, and rivaroxaban were markedly less likely than those prescribed warfarin or enoxaparin to have a DVT within 6 months after THA or TKA. They concluded that after THA and TKA, warfarin is the most commonly prescribed prophylaxis. Patients with hypercoagulability diagnoses are at a higher risk of postoperative DVT. The likelihood of DVT within 6 months of THA and TKA was markedly higher in patients treated with warfarin and lovenox and markedly lower in those treated with aspirin, fondaparinux, and rivaroxaban.

Javed Parvizi et al[89] in 2017 conducted a prospective, crossover study, which analyzed 4,651 primary total joint arthroplasty cases performed from July 2013 to June 2015. For 4 weeks, 3,192 patients received enteric-coated 325-mg aspirin twice daily (the 325-mg aspirin group) and 1,459 patients received 81-mg aspirin twice daily (the 81-mg aspirin group). There were no significant differences in sex, body mass index, or Charlson Comorbidity Index between the two patient populations. Recorded complications occurring within 90 days postoperatively included symptomatic venous thromboembolism (deep venous thrombosis and pulmonary embolism), gastrointestinal complications, acute periprosthetic joint infection, and death. The incidence of venous thromboembolism of 0.1% in the 81-mg aspirin group (1 with deep venous thrombosis and 1 with pulmonary embolism) was not significantly different from 0.3% in the 325-mg aspirin group (7 with deep venous thrombosis and 5 with pulmonary embolism). The incidence of gastrointestinal bleeding or ulceration of 0.3% in the 81-mg aspirin group was slightly, but not significantly, lower than the 0.4% in the 325-mg aspirin group. The incidence of acute periprosthetic joint infection was 0.2% in the 81-mg aspirin group compared with 0.5% in the 325-mg aspirin group. The 90-day mortality rate was similar in both groups at 0.1% in the 81-mg aspirin group and 0.1% in the 325-mg aspirin group. The prospective study demonstrates that aspirin combined with in-hospital mechanical prophylaxis is a safe and effective modality for the prevention of venous thromboembolism

following total joint arthroplasty. The study revealed that a low dose of aspirin (81 mg twice a day), both plain and enteric-coated, is not inferior to a higher dose of enteric-coated aspirin (325 mg twice a day in the prevention of venous thromboembolism.

Abiram Bala et al[90] in 2017 queried a combined Humana and Medicare database between 2007 and Quarter 1 of 2016, and identified all primary TKAs performed using ICD-9 and Current Procedural Terminology codes. All patients who had any form of antiplatelet or anticoagulation prescribed within 1 year before TKA were excluded from our study cohort. Then they identified patients who had either aspirin, warfarin, enoxaparin, or factor Xa inhibitors prescribed within 2 weeks of primary TKA. Each cohort was matched by age and sex. Elixhauser comorbidities and Charlson Comorbidity Index for each group were calculated. We identified 1,016 patients with aspirin, and age- and sexmatched 6,096 patients with enoxaparin, 6,096 patients with warfarin, and 5080 patients with factor Xa inhibitors. Using ICD-9 codes, with the understanding that patients at greater risk may have had more-attentive surveillance, the incidence of postoperative deep venous thrombosis (DVT), pulmonary embolism (PE), bleeding-related complications (bleeding requiring surgical intervention, hemorrhage, hematoma, hemarthrosis), postoperative anemia, and transfusion were identified at 2 weeks, 30 days, 6 weeks, and 90 days postoperatively. A four-way chi-squared test was used to determine statistical significance. Utilization was calculated using compound annual growth rate. There was a difference in the incidence of DVT at 90 days. Factor Xa inhibitors (2.9%) had the lowest incidence of DVT followed by aspirin (3.0%) and enoxaparin (3.5%), and warfarin (4.8%). There was a difference in the incidence of PE at 90 days. Factor Xa inhibitors (0.9%) had the lowest incidence of PE followed by enoxaparin (1.1%), aspirin (1.2%), and warfarin (1.6%). There was a difference in the incidence of postoperative anemia at 90 days. Aspirin (19%) had the lowest incidence of postoperative anemia followed by warfarin (22%), enoxaparin (23%), and factor Xa inhibitors. The study showed that aspirin is an effective thromboprophylactic

agent with a favourable complication profile. Factor Xa inhibitors, even when used in patients who are more medically complex, also showed a low incidence of VTE. Enoxaparin, while showing a higher rate of bleeding complications, may still benefit patients who are appropriately selected.

Guy Cafri et al[91] in 2017 studied data were from a U.S. total joint replacement registry, with 30,499 patients receiving unilateral total knee arthroplasty (TKA) from May 16, 2006 to December 31, 2013. Patients received either aspirin (324-325mg daily), enoxaparin (40-60mg daily), fondaparinux (2.5mg daily), or warfarin (all doses) and were followed up 90 days postoperatively on several outcomes: deep vein thrombosis (DVT), pulmonary embolism (PE), major bleeding, wound complications, infection and death. There was no evidence that fondaparinux, enoxaparin, or warfarin were superior to aspirin in the prevention of PE, DVT, or VTE or that aspirin was safer than these alternatives. However, enoxaparin was found to be as safe as aspirin with respect to bleeding, and fondaparinux was as safe as aspirin for risk of wound complications. Among TKA patients they did not find evidence for decreased effectiveness or increased safety with use of aspirin, but enoxaparin had comparable safety to aspirin for bleeding.

Janet Chu et al[92] in 2017 conducted a retrospective cohort study of 231,780 adults who underwent total knee arthroplasty and 110,621 who underwent total hip arthroplasty in 2009-2012 and who received pharmacologic VTE prophylaxis (aspirin or anticoagulant) within the first 7 days after surgery. They compared the risk of post-operative VTE between patients receiving aspirin-only vs. anticoagulants, controlling for clinical and hospital characteristics using multivariable logistic regression with propensity score adjustment. Aspirin-only prophylaxis was administered to 7.5% of patients after knee arthroplasty and 8.0% after hip arthroplasty. Post-operative VTE was diagnosed in 2,217 (0.96%) patients after knee arthroplasty and 454 (0.41%) after hip arthroplasty. Compared to anticoagulants, aspirin was not associated with a higher risk for post-operative VTE after knee

arthroplasty. Patients who received aspirin-only had similar rates of post-operative VTE compared to patients who received anticoagulants.

Alok Kapoor et al[93] in 2016 abstracted VTE and hemorrhage information from randomized controlled trials published between January 1990 and June 2016 comparing 12 prophylaxis options and then constructed networks to compute relative risk for each option relative to low molecular weight heparin at once daily dosing (LMWH Low). They concluded that relative to LMWH Low, direct oral Xa inhibitors had the lowest risk of total DVT - asymptomatic and symptomatic translating to 53 to 139 fewer DVTs per 1000 patients. VKAs titrated to INR 2-3 predicted 56% more DVT events .Aspirin performed similarly although small numbers prohibit firm conclusions.

Sarav V Shah et al[94] in 2016 conducted a retrospective chart review. They collected data to assess preoperative VTE risk and examined VTE prophylaxis prescriptions on postoperative day 1 (POD1) and at discharge (D/C) from 7/2008 to 12/2011 (pre-period) and 1/2012 to 7/2014 (post-period). Patients on preoperative full-dose anticoagulation and with hypercoagulability disorders were excluded. Of 368 records reviewed, 329 were included in the analysis. On POD1, in the pre-period, 4.6 % were prescribed ASA monotherapy versus 44.4 % in the post-period. On D/C, in the pre-period, 13.9 % were prescribed ASA versus 55.6 % in the post-period. The results indicated a statistically significant change in orthopedicians prescribing patterns after guideline convergence. Furthermore, there was no apparent change in VTE risk between the two study groups when excluding patients necessitating full anticoagulation. Prior literature has shown that the divergence in guidelines influenced physicians away from ASA and toward more potent anticoagulants in order to avoid potential litigation. Once its role in VTE prophylaxis was supported by the ACCP, it appears that ASA monotherapy was readily and rapidly incorporated into clinical practice. ASA may be favored over other VTE prophylaxis agents for its lower bleeding risk profile and cost. This study highlights the profound impact clinical practice guidelines have on clinician prescribing patterns. Although prospective randomized trials are needed to compare the

efficacy of ASA with other VTE prophylaxis agents, ASA is now a predominant part of the VTE prophylaxis armamentarium after TKA.

Shaheel M. Sahebally et al[95] in 2015 retrieved English language studies meeting their inclusion criteria from PubMed, EMBASE and Cochrane databases. Six studies (three meta-analyses and three randomized trials) comparing ASA with placebo and seven studies (one meta-analysis, five randomized trials, and one prospective) comparing ASA with other anticoagulants were included in the final analysis. Retrospective studies and case reports were excluded and concluded that ASA is more effective than placebo in primary VTE prevention. Although there is clinical equipoise when ASA is compared with other anticoagulants, studies specific to orthopaedic surgery suggest that ASA appears as effective as low molecular weight heparin (LMWH) and may reduce bleeding risk. Extended prophylaxis up to four weeks post-surgery reduces VTE episodes. ASA may be considered as a potential strategy in primary VTE prophylaxis in orthopaedic patients at high-risk of bleeding complications.

Zou et al[96] in 2014 conducted a prospective randomized controlled trial on 324 patients with osteoarthritis who underwent primary unilateral TKA. Twelve hours after the surgery, Group A was given oral rivaroxaban at a dose of 10 mg/day. Group B was given subcutaneous LMWH at a dose of 4000 AxaIU (0.4 ml)/day and Group C was given oral aspirin at a dose of 100 mg/day. All three groups were treated for 14 days, and all of the patients were followed for 4 weeks. The incidence of DVT, dominant/hidden blood loss, the incidence of wound complications and the incidence of subcutaneous ecchymosis in the affected extremities were compared between the three groups. Rivaroxaban had a positive anticoagulation effect but lead to increase in both postoperative blood loss and wound complications in patients. Hence, clinicians using rivaroxaban for anticoagulant therapy should closely monitor the changes in the hemoglobin level and wound healing and promptly supplement blood volume and provide other symptomatic and supportive treatments. No significant difference in post-TKA DVT

prophylaxis was found between aspirin and LMWH, and the former can be used as part of a multimodal anticoagulation therapy.

Bloch et al[97] in 2014 recorded that dabigatran caused a significant increase in leakage from the wound ($p < 0.001$), an increase in the length of stay in hospital ($p = 0.04$) and higher rates of VTE ($p = 0.047$) when compared with the use of a multimodal prophylaxis protocol (LMWH inpatient and extended use of aspirin).

Mark W Gesell et al[98] in 2013 conducted a study of 1016 consecutive patients undergoing TKA who received multimodal thromboprophylaxis. Aspirin was used in 67% of patients and Coumadin 33% (high risk patients, or who were on Coumadin before surgery). This study group was compared to 1001 consecutive patients who received multimodal thromboprophylaxis and routine Coumadin chemoprophylaxis. There was no significant difference in rates of VTE, PE, bleeding, complications, readmission and 90-day mortality between the two groups. There was a significantly higher rate of wound related complications in the control group. Multimodal thromboprophylaxis with aspirin given to the majority of patients at a low VTE risk is safe and effective in patients undergoing primary TKA.

Kevin J Bozic et al[99] in 2010 conducted a study with objectives to compare the risk of venous thromboembolism (VTE), bleeding, surgical site infection, and mortality in patients receiving aspirin or guideline approved VTE prophylactic therapies (warfarin, low-molecular-weight heparins, synthetic pentasaccharides) in total knee arthroplasty (TKA). They analyzed clinical and administrative data from 93,840 patients who underwent primary TKA at 307 US hospitals over a 24-month period. 51,923 (55%) patients received warfarin, 37,198 (40%) received injectable agents, and 4,719 (5%) received aspirin. After adjustment for patient and hospital factors, patients who received aspirin VTE prophylaxis (VTEP) had lower odds for thromboembolism compared to warfarin patients but with similar odds compared with injectable VTE prophylaxis; there were no differences in risk of bleeding, infection, or mortality after adjustment. Their results suggest

that aspirin, when used in conjunction with other clinical care protocols, may be effective VTEP for certain TKA patients.

V BAGARAI et al[100] in 2006 conducted a prospective study on 147 patients undergoing major orthopaedic surgery for total knee replacement (TKA), total hip replacement (THA), and proximal femur fracture fixation (PFF)without any prophylaxis. These patients were profiled for presence of the known risk factors responsible for development of VTE. A duplex ultrasound on both lower limbs was done 6 to 10 days after surgery. Twenty three patients underwent THA, 22 patients underwent TKA, and 102 underwent surgery for PFF. The patients were assessed clinically for any signs of deep venous thrombosis (DVT) and pulmonary embolism (PE). A helical CT scan was done in case of suspicion of PE and a duplex ultrasound was done in case of clinical suspicion of DVT irrespective of the stage of study. The study reconfirmed the belief that DVT has a lower incidence in Indian patients as compared with other ethnic groups.

MATERIALS AND METHODS

SOURCE OF DATA

This was a prospective study including 166 patients carried out to to review and analyse the role of aspirin in prevention of venous thromboembolism (VTE) following total knee arthroplasty over a period of one and half year between January 2019 to May 2020 at Department Of Orthopaedics, Dayanand Medical College, Ludhiana. Out of 166 patients, unilateral total knee arthroplasty was performed in 73 patients while bilateral total knee arthroplasty was performed in 93 patients, thus making a total of 259 operated knees.

METHOD OF COLLECTION OF DATA

After obtaining clearance and approval from the institutional ethical committee, patients fulfilling the inclusion / exclusion criteria were included in the study after obtaining informed consent.

INCLUSION CRITERIA:

Undergoing TKA for knee arthritis and taking aspirin as DVT prophylaxis in post operative period.

EXCLUSION CRITERIA:

- Patient with underlying chronic DVT.
- Patient with underlying prior VTE event.
- Patient with underlying gastric ulcers.

PREOPERATIVE EVALUATION:

Detailed history was obtained and all the patients were assessed pre-operatively using a proforma with Modified Wells criteria for DVT and for PE.

POST OPERATIVE PERIOD

Patients were given Low molecular weight heparin (Enoxaparin 40mg OD s/c) during hospital stay and physical therapy was started on first postoperative day. Patients were started on tab Aspirin 150mg once daily for four weeks at discharge.

PHYSIOTHERAPY PROTOCOL

POST-OPERATIVE (DAY 0 TO DAY 3):

Control swelling, inflammation and pain

Initiate therapeutic exercises: Quadriceps, hamstrings, ankle pumps, straight leg raises

Safe ambulation with walker

Range of motion up to 90 degrees flexion and 0 degree extension

+/- Continous Passive Motion exercises.

DISCHARGE TO POSTOP WEEK 2:

Control pain and inflammation

Safe functionally within home

Quadriceps, hamstrings, ankle pumps, straight leg raises

Increase range of motion to 0 – 100 degrees

Outpatient Physiotherapy.

FOLLOWUP

Patients were re-assessed, post operatively on post operative day 1,at discharge, suture removal and at one month and three months follow up.

Adverse events like dyspnoea, tachycardia, chest Pain, haemoptysis, bleeding from wound site / wound hematoma which do not require any surgical intervention (minor bleeding) and bleeding from wound site which requires surgical intervention, upper GI bleed, lower GI bleed (major bleeding) were monitored .

Venous doppler was planned to be done if Well's score probability score is more than two for DVT or in case of clinical signs/symptoms of DVT. CT pulmonary angiography was planned to be done in case of suspected pulmonary embolism changes or Well's PE score more than four.

All cause 30 day and 90 day readmission rate and one year mortality rate was also calculated.

DATA ANALYSIS

Data were described in terms of range; mean ±standard deviation (± SD), frequencies (number of cases) and relative frequencies (percentages) as appropriate. All statistical calculations were done using SPSS (Statistical Package for the Social Science) SPSS 21version statistical program for Microsoft Windows.

OBSERVATION AND RESULTS

The following observations were made from the data collected during the study on "the role of aspirin in prevention of venous thromboembolism (VTE) following total knee arthroplasty **(**TKA)." in the Department of Orthopaedics, DMCH, Ludhiana. This study is a prospective study conducted on a total of 166 patients who underwent TKA in this hospital and met the inclusion criteria. The data is being presented here.

Table 1: Distribution of patients according to age

Age(yrs)	No. of cases	Percentage (%)
<50	11	6.6
51-60	56	33.7
61-70	71	42.8
71-80	25	15.1
80 & above	3	1.8
Total	166	100.0

The average age of patients in the study is 63.0 years and range 37-87 years. 76.5% of patients were between 51-70 years age group, 16.9% above 71 year age group and 6.6% below 50 years age.

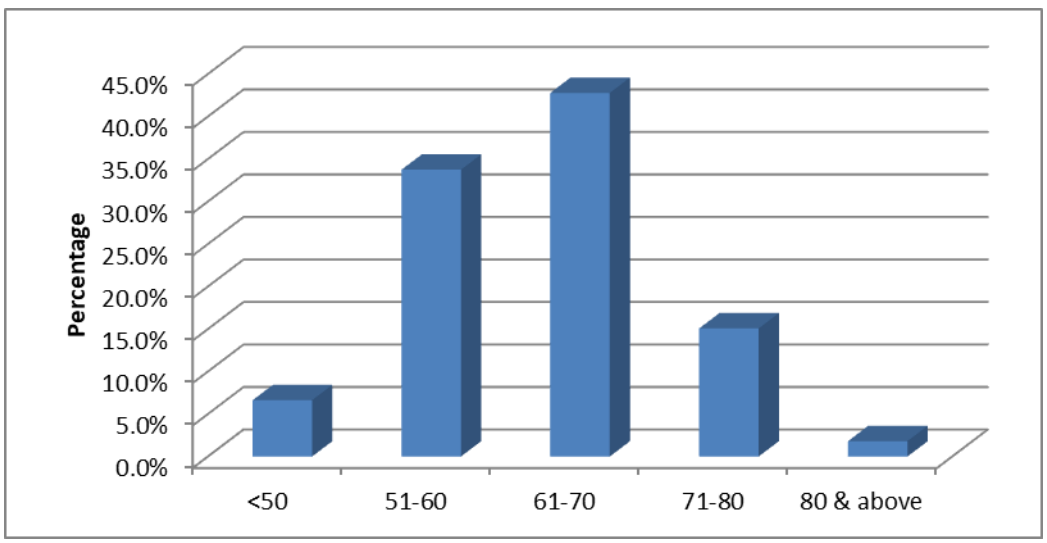

Figure 1: Distribution of patients according to age

Table 2: Distribution of patients according to gender

Gender	No. of cases	Percentage (%)
Female	114	68.7
Male	52	31.3
Total	166	100.0

68.7% of patients were females and 31.3% were males. In this study sex ratio was notable females out numbering males.

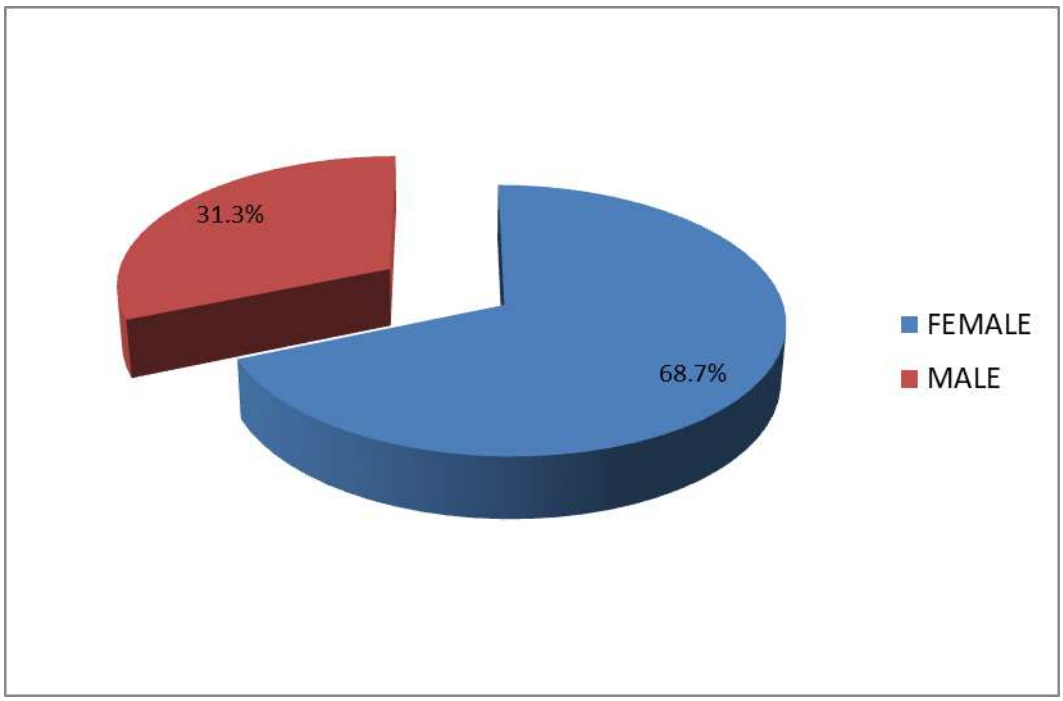

Figure 2: Distribution of patients according to gender

Table 3: Distribution of patients according to occupation

Occupation	No. of cases	Percentage (%)
Housewife	82	49.4
Retired	25	15.1
Others	14	8.4
Total	166	100.0

Majority of the patients; 49.4% were housewives. 27.1% were dependent, 15.1% were retired individuals.

Table 4: Distribution of patients according to BMI

BMI	No. of cases	Percentage (%)
< 24.9	51	30.7
25-29.9	115	69.3
> 30	0	0.0
Total	166	100.0

Majority (69.3%) of the patients were overweight and rest had normal BMI. Range of BMI is 22 to 29.9 with mean BMI 25.6.

Table 5: Distribution of patients according to etiology of knee degeneration

Diagnosis	No. of cases	Percentage (%)
Osteoarthritis	162	97.6
Rheumatoid Arthritis	4	2.4
Total	166	100.0

Out of the total patients who underwent TKA, 97.6% had osteoarthritis. Only 2.4% patients had rheumatoid arthritis.

Table 6: Distribution of patients according to the side of proposed TKA

Side of proposed TKA	No. of cases	Percentage (%)
BILATERAL	93	56.0
UNILATERAL	73	44.0
Total	166	100.0

93 out of 166 patients underwent Bilateral TKA. 73 patients underwent Unilateral TKA making it total of 259 operated knees.

Table 7: Distribution of patients according to duration of complaints

Duration of complaints (in years)	No. of cases	Percentage (%)
<1	3	1.8
1-2.0	9	5.4
2-5.0	83	50.0
5-10.0	56	33.7
>10	15	9.0
Total	166	100.0

Majority of patients undergoing TKA had complaints for 2-10 years (2-5 years: 50% and 5-10 years: 33.7%). 6.2% patients had complaints for less than two years whereas 9% had complaints for more than ten years.

Table 8: Distribution of patients based on comorbidities

	No. of cases	Percentage (%)
Hypertension	84	50.6
Diabetes Mellitus	37	22.3
Coronary artery disease	18	10.8
Smoking	1	0.6
Cancer	3	1.8
Hypothyroidism	1	0.6
Obesity	0	0.0

57.8% (n=96) patients suffered from comorbidities. Out of 166 patients, 84 (50.6%) suffered from Hypertension whereas the next most common co-morbidity was Diabetes mellitus which was seen in 37 patients. 18 patients suffered from Coronary artery disease and one patient suffered from Hypothyroidism. Three patients in our study group suffered from Carcinoma breast.

Table 9: Distribution of patients according to the duration of Hypertension

Hypertension Duration	No. of cases	Percentage (%)
< 10YR	33	39.3
>10YR	51	60.7
Total	84	100.0

84 out of 166 patients were Hypertensive, of which 51 patients had history of Hypertension for more than ten years.

Table 10: Distribution of patients according to the duration of Diabetes mellitus

Diabetes mellitus Duration	No. of cases	Percentage (%)
< 10YRS	16	43.2
> 10YRS	21	56.8
Total	37	100.0

37 out of 166 patients had Diabetes mellitus type, of which 21 patients had history of Diabetes mellitus for more than ten years.

Table 11: Distribution of patients based on history of inactivity and immobilization

History of Inactivity & Immobilisation	No. of cases	Percentage (%)
NO	166	100.0

None of the patients had history of inactivity and immobilisation.

Table 12: Distribution of patients according to duration of Coronary artery disease

Coronary artery disease Duration	No. of cases	Percentage (%)
< 10YRS	9	50.0
> 10YRS	9	50.0
Total	18	100.0

18 out of 166 patients had Coronary artery disease, of which nine patients had Coronary artery disease for more than ten years.

Table 13: Distribution of patients based on prior anticoagulant use

Prior anticoagulant use before TKA	No. of cases	Percentage (%)
NO	152	91.6
YES	14	8.4
Total	166	100.0

14 out of 166 patients had history of prior anticoagulant use.

Table 14: Distribution of patients based on type of prior anticoagulant use

Anticoagulant used for CAD	No. of cases	Percentage (%)
CLOPIDOGREL	8	57.1
NICOUMALONE	4	25.5
DABIGATRAN	2	14.2
TOTAL	14	100

14 Patients took anticoagulants in past for Coronary artery disease. Eight patients took Clopidogrel, four patients were on Nicoumalone and two patients took Dabigatran.

Table 15: Distribution of patients based on presence of inflammatory/autoimmune disease

Inflammatory/autoimmune disease	No. of cases	Percentage (%)
NO	162	97.6
YES	4	2.4
Total	166	100.0

Four patients out of 166 had inflammatory/autoimmune disease (rheumatoid arthritis).

Table 16: Distribution of patients based on history of hormonal replacement therapy in past

Hormonal replacement therapy	No. of cases	Percentage (%)
NO	164	98.8
YES	2	1.2
Total	166	100.0

Two patients were under hormonal replacement therapy. Both patients were taking Estradiol which increases the risk of DVT.

Table 17: Distribution of patients according to Charlson Comorbidity Index

Charlson Comorbidity Index	No. of cases	Percentage (%)
< 2	8	4.8
2-4.0	147	88.6
5	11	6.6
Total	166	100.0

Majority of patients in our study group had Charlson comorbidity scores from 2-4 (88.5%) indicating the moderate severity of associated co-morbidity .Another 6.6% patients had scores five whereas 4.8% had score <2. Range of Charlson comorbidity index is 0 to 5 and average is 2.90

Table 18: Distribution of patients according to Charnley Classification

Charnley Classification	No. of cases	Percentage (%)
A	52	31.3
B	113	68.1
C	1	0.6
Total	166	100.0

Majority of patients belonged to Charnley class B highlighting the high incidence of either the need for arthroplasty in a joint other than that being replaced or association with co-morbidity in patients undergoing TKA.

Table 19: Distribution of patients based on length of stay

Length of stay (days)	No. of cases	Percentage (%)
6	64	38.6
7	97	58.4
8	4	2.4
10	1	0.6
Total	166	100.0

Most patients had seven days as their length of stay in hospital. Range of length of stay is six to ten days. Average length of stay was 6.6 days

Post-operatively DVT/VTE status

None of the patients had signs or symptoms like localized tenderness along the deep venous system, entire leg swollen, calf swelling >3cm on asymptomatic side, pitting oedema confined to symptomatic leg, collateral superficial veins, hemoptysis, breathlessness, pain in calf and thigh, homan's sign suggestive of DVT/PE in post-operative period in study.

Table 20: Distribution of patients based on modified Well's score for DVT

Asesment No of patients	Preop	Immediate postop	At Discharge (Day 7)	At Suture Removal	At 1 month	At 3 month
166	0	0	0	0	0	0

Our study reported modified Well's score for DVT to be zero in all 166 patients.

Table 21: Distribution of patients based on modified Well's score for PE

No of patients	Preop	Immediate postop	At Discharge (Day 7)	At Suture Removal	At 1 month	At 3 month
16	0	1.5	0	0	0	0
150	0	0	0	0	0	0

16 patients in the study had immediate post-operative modified Well's score of 1.5 due to heart rate >100 while 150 patients had zero modified Well's score. Range of Well's Score for PE was 0-1.5 and average modified Well's score for PE is 0.144.

Doppler of bilateral lower limb and CT pulmonary angiography was not required in any patient as the modified Well's score for DVT and PE was less than two and less than four respectively for DVT and PE.

Table 22: Distribution of patients based on complications

Complications	No. of cases	Percentage (%)
Bleeding from wound site/ wound hematoma(Minor bleeding)	10	6.0
Major bleeding(requiring surgical intervention)	0	0.0
Upper GI bleed	0	0.0
Lower GI bleed	0	0.0
Infection	0	0
Mortality(COVID-19 related)	1	0.6

10 out of 166 patients had bleeding from wound site or wound hematoma which resolved with aseptic dressings and extended administration of oral antibiotics. None of the patients required modification of dose of aspirin because of wound complications.

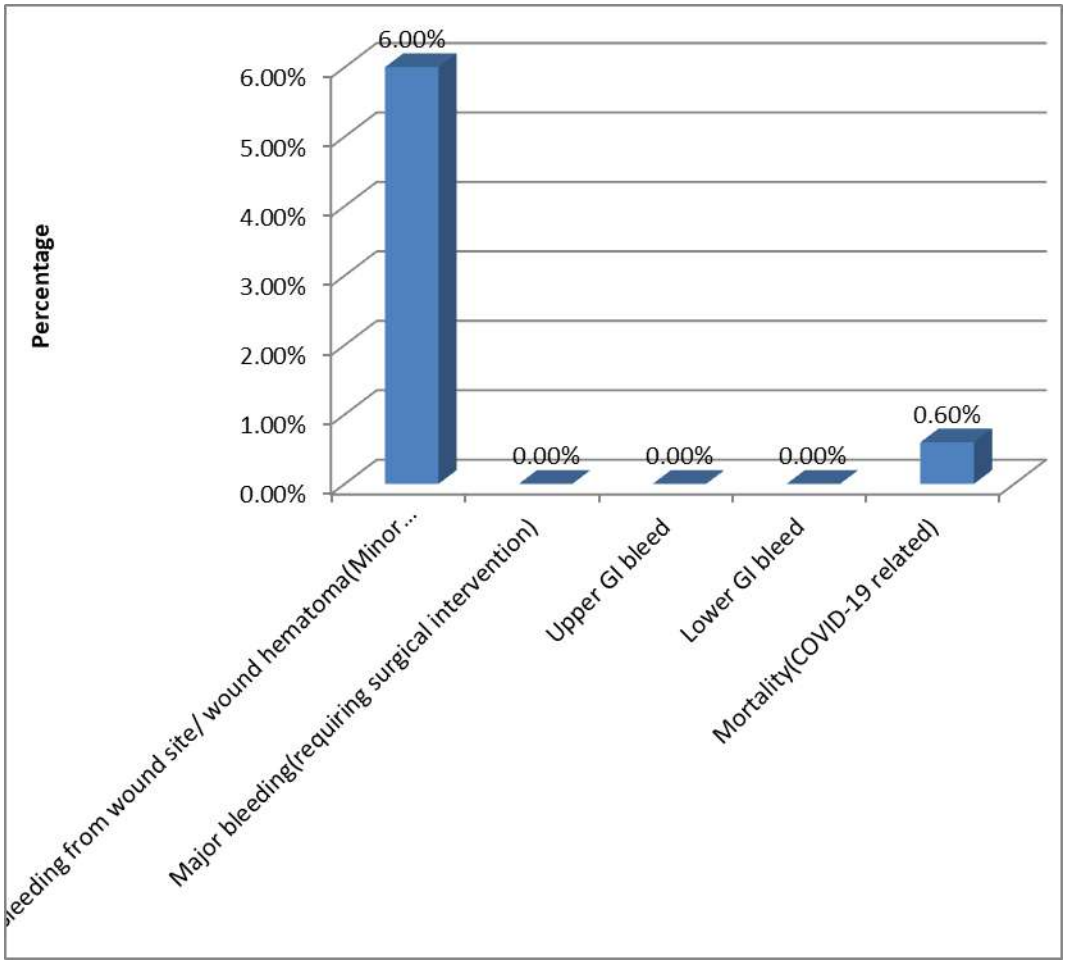

Figure 3: Distribution of patients based on Complications

Follow up period:

All patients were followed with range of follow up period from 7.5 months to 22 months (average 15.75 months).

Table 23: Distribution of patients based on cause of readmission to hospital

Patient Serial Number	Cause	Time duration for Readmission after surgery	Planned/unplanned	Final status
142	Contralateral TKA	4 months	Planned	Discharged
26	Increased creatinine	6 months	Unplanned	Discharged
99	Contralateral TKA	7 months	Planned	Discharged
25	Distal femur fracture	10 months	Unplanned	Discharged
54	Difficulty breathing (COVID-19)	12 months	Unplanned	Death
6	Ankle arthrodesis	12 months	Planned	Discharged

Six patients out of 166 were readmitted to hospital in follow up period.

In our study we reported all cause 30 days readmission rate and 90 days readmission rate to be zero.

Table 24: Distribution of patients based on causes of unplanned visits to hospital not resulting in admission

Patient Serial Number	Cause	Time duration for Unplanned visit to hospital after surgery
8	Body aches	3 months
153	Pain and stiffness in operated limb	7 months

Two patients required unplanned visit to hospital OPD but did not require admission in follow up period. Four patients had re-surgery in follow up period.

Table 25: Distribution of patients based on causes of Re-surgery

	Patient Serial Number	Re-surgery	Time after TKA	Planned/ Unplanned
1	142	Contralateral TKA	4 months	Planned
2	99	Contralateral TKA	7 months	Planned
3	25	Distal femur fracture left side (periprosthetic)due to fall at home managed with Distal femur plating)	10 months	Unplanned
4	6	Ankle arthrodesis left(talo-navicular degeneration)	12 months	Planned

Mortality Rate:

In our study we reported 30 days mortality and 90 days mortality rate to be zero.

One year mortality rate is 0.006 with 1/166 mortality due to COVID -19 illnesses (September 2020).

DISCUSSIONS

The present study enrolled a total of 166 patients undergoing TKA. Patients were given Low molecular weight heparin (Enoxaparin 40mg OD s/c) during hospital stay and patients were started on tab Aspirin 150mg once daily for four weeks at discharge as DVT prophylaxis agent. Complete data of 166 patients was available for compilation and analysis.

Age: Alexander J. Rondon et al[79] in 2019 conducted a study in which the mean age was 63.9 years. Gulraj S. Matharu et al[80] in 2020 performed a systematic review and meta-analysis of randomized clinical trials in which mean age was 63 years. Y I Zeng et al[81] in 2018 conducted a study in which average age was 65.7 years. Brandon R Hood et al[82] in 2018 conducted a study in which average age was 65.6 years. Robert P Runner et al[84] in 2018 conducted a study in which mean age was 65.3 years. Mhamad Faour, et al[86], in 2018 conducted a study in which mean age was 68 years. Javed Parvizi et al[89]in 2017 conducted a study in which mean age was 63.7 years. Harpreet Bawa et al[88] in 2018 analysed patients of mean age 61.9 years. Guy Cafri et al in 2017[91] studied data were from a U.S. total joint replacement registry, with patients having mean age 66.6 years. Sarav V Shah et al[94] in 2016 conducted a retrospective chart review with patients having mean age 67 years. In our study, mean age of patients enrolled was 63 years. The average age for patients having knee degeneration and being operated for TKA is 63 years.

Sex : Gulraj S. Matharu et al[80] in 2020 performed a systematic review and meta-analysis of randomized clinical trials in which females were 57.2%. Y I ZENG et al[81] in 2018 conducted a study in which females were 76.6%. Brandon R Hood et al[82] in 2018 conducted a study in which females were 61.9%. Robert P Runner et al[84] in 2018 conducted a study in which females were 54.6%. Shawn S Richardson et al[85] in 2019 identified patients undergoing unilateral TKA with females accounting to 61.1%. Harpreet Bawa et al[88] in 2018 analysed patients in which females were 56.6%. Abiram Bala et al[90] in 2017

conducted a study with females accounting up to 53%. Janet Chu et al[92] in 2017 conducted a retrospective cohort study in which females were 61.1%. Alok Kapoor et al[93] in 2016 conducted a study with females comprising 61%. Sarav V Shah et al[94] in 2016 conducted a retrospective review with females accounting 62.4%. Zou et al[96] in 2014 conducted a prospective randomized controlled trial with females 74.5%. Our study included 166 patients of which females constituted 68.7% whereas males constituted 31.3%. In patients undergoing TKA females predominate males.

Co-morbidities: YI ZENG et al[81] in 2018 conducted a study in which 22.7% patients had hypertension and 6.1% had diabetes mellitus. Shawn S Richardson et al[85] in 2019 conducted a study in which 61.6% patients had hypertension and 16.9% had diabetes mellitus. Janet Chu et al[92] in 2017 conducted a study in which 65.7% patients had hypertension and 18.8% had diabetes mellitus. Kevin J Bozic et al[99] in 2010 conducted a study in which 63% patients had hypertension and 16% had diabetes mellitus. Half of the patients enrolled in our study suffered from Hypertension (50.6%).Other associated co-morbidities found in a minority of patients were Diabetes Mellitus II (22.3%), CAD, Asthma, Hypothyroidism. 13.2% patients had no co-morbidity. In our study there was no DVT, so the inference that there is relation of hypertension and diabetes mellitus to occurrence of DVT could not be derived. It may be due to small sample size or maybe due to aspirin used a VTE agent.

Complications:

DVT/PE: None of the patients had signs or symptoms like localized tenderness along the deep venous system, entire leg swollen, calf swelling >3cm on asymptomatic side, pitting oedema confined to symptomatic leg, collateral superficial veins, haemoptysis, breathlessness, pain in calf and thigh, homan's sign suggestive of DVT/PE in post operative period in our study.

Our study reported modified Well's score for DVT to be zero in all 166 patients. 16 patients in the study had immediate post operative modified Well's score for PE of 1.5 due to heart rate >100 while 150

patients had zero modified Well's score. Range of Well's Score for PE was 0-1.5 and average modified Well's score for PE is 0.144.

Doppler of bilateral lower limb and CT pulmonary angiography was not required in any patient as the Well's score for DVT and PE was less than two and less than four respectively for DVT and PE.

Alexander J Rondon et al[79] reviewed 31,333 patients who underwent primary TJA . None of the patients who took aspirin as DVT prophylaxis agent developed signs and symptoms of VTE. Gulraj S Matharu et al[80] conducted a study in patients undergoing TKA and THA. In the study 18 out of 2130 (0.84%) patients receiving aspirin as DVT prophylaxis agent developed symptomatic DVT. 26 out of 1978 (1.31%) patients receiving rivaroxaban as DVT prophylaxis agent developed symptomatic DVT. 61 out of 747 (8.16%) patients receiving LMWH as DVT prophylaxis agent developed symptomatic DVT. 53 out of 2303 (2.3%) receiving mechanical prophylaxis as DVT prophylaxis agent developed symptomatic DVT. Y I Zeng et al[81] conducted a study in which none of the patients taking aspirin as DVT prophylaxis agent had DVT whereas seven out of 8638 (0.08%) patients taking LMWH had DVT and 24 out of 8638 (0.27%) patients taking factor Xa inhibitor agents had DVT. Brandon R Hood et al[82] conducted a study in which 149 out of 12831 (1.16%) patients taking aspirin, 321 out of 22620 (1.41%) taking anticoagulation and 71 out of 5418 (1.31%) taking combined aspirin and anticoagulation as DVT prophylaxis had an event of VTE. Sinan Nadi et al[83] conducted a study comparing aspirin and enoxaparin as thromboprophylaxis agent and found no statistical significance in total DVT and PE rates between aspirin and enoxaparin. Shawn S Richardson et al[85] conducted a study to compare pharmacologic prophylaxis in prevention of venous thromboembolism following total knee arthroplasty and found that 2.37% patients taking aspirin, 1.33% patients LMWH, 1.69% patients taking warfarin, 1.21% patients taking factor Xa inhibitors and less than 0.71% patients taking fondaparinux had incidence of DVT. This study also noted that less than 2.01% patients taking aspirin, 0.54% patients LMWH, 0.60% patients taking warfarin, 0.58% patients taking factor Xa inhibitors and

less than 0.71% patients taking fondaparinux had PE. Mhamad Faour et al[86] conducted a study comparing two regimens of aspirin as DVT prophylaxis agent. The incidence of VTE was 0.5% in 325-mg group and 0.7% in 81-mg group. Symptomatic DVT was 1.4% in the 325-mg aspirin compared to 0.3% for 81-mg aspirin. The incidence of PE was 0.2% in high dose aspirin group compared to 0.4% in low dose aspirin group. Harpreet Bawa et al[88] conducted a study in which DVT were recorded in 2.2% of the patients taking aspirin, 4.74% patients taking warfarin, 2.69% taking fondaparinux , 3.74% taking enoxaparin (LMWH), 1.86% for rivaroxaban, 3.83% for dabigatran and 2.17% taking no anticoagulation as prophylaxis for DVT in patients undergoing TKA and THA. Javed Parvizi et al[89] conducted a study in patients undergoing TKA comparing 2 doses of aspirin as DVT prophylaxis agent. 0.1% patients in 81mg aspirin group had incidence of VTE (zero DVT and one PE) and 0.4% patients in 325mg aspirin group had incidence of VTE (three DVT and five PE). Abiram Bala et al[90] conducted a study comparing various agents for DVT prophylaxis following TKA. At 90 days factor Xa inhibitors (2.9%) had lowest incidence of DVT followed by aspirin (3%), enoxaparin (LMWH) (3.5%) and warfarin (4.8%). Guy Cafri et al[91] conducted a study to compare various VTE prophylaxis agents following TKA. 0.53% patients taking aspirin, 0.5% patients taking fondaparinux, 0.5% taking enoxaparin (LMWH) and 0.7% taking warfarin had DVT. 0.7% patients taking aspirin, 0.41% patients taking fondaparinux , 0.62% taking enoxaparin (LMWH) and 0.5% taking warfarin had PE. Janet Chu et al[92] compared risk of VTE with aspirin and other anticoagulants.0.04% patients taking aspirin. 0.32% patients taking anticoagulant and 0.47% patients taking both aspirin and anticoagulants had DVT. 0% patients taking aspirin, 0.02% patients taking anticoagulant and 0.04% patients taking both aspirin and anticoagulants had PE. Yue Zou et al[96] conducted a study to compare the efficacy and safety of aspirin, rivaroxaban and low-molecular-weight heparin (LMWH) for post total knee arthroplasty (TKA). It concluded that 2.94% patients taking oral rivaroxaban, 12.5% taking LMWH, 16.36% taking aspirin had DVT.

Wound Complications: In our study, 10 out of 166 (6.02%) patients had bleeding from wound site / wound hematoma which resolved with aseptic dressings and prolonged administration of oral antibiotics (minor bleeding).None of the patients required any surgical intervention. There was no infection in post operative period. No upper and lower GI bleed seen.

Gulraj S Matharu et al[80] conducted a study in patients undergoing TKA and THA The risk of adverse events, including major bleeding, wound hematoma and wound infection was not statistically significantly different in patients receiving aspirin vs other anticoagulants. Y I ZENG et al[81] conducted a study in which nine out of 8638 patients had major bleeding in critical organ, five with LMWH, three with factor Xa inhibitors and one with no medication. Brandon R Hood et al[82] conducted a study in which 116 out of 12831(0.9%) patients taking aspirin , 258 out of 22620 (1.25%) taking anticoagulation and 73 out of 5418 (1.34%) taking combined aspirin and anticoagulation as DVT prophylaxis had an episode of bleeding. Sinan Nadi et al[83] conducted a study comparing aspirin and enoxaparin as thromboprophylaxis agent and found no statistical significance in major bleeding and wound complications between aspirin and enoxaparin. Shawn S Richardson et al[85] conducted a study to compare pharmacologic prophylaxis in prevention of venous thromboembolism following total knee arthroplasty and found that less than 2.01% patients taking aspirin, 1.03% patients LMWH, 0.79% patients taking warfarin, 0.81% patients taking factor Xa inhibitors and less than 0.71% patients taking fondaparinux had hematoma. Mhamad Faour et al[86] conducted a study comparing two regimens of aspirin as DVT prophylaxis agent. The incidence of bleeding in the study population was 0.2% (10 of 5,666 patients). The incidence of bleeding after surgery was 0.2% in the 325-mg aspirin group compared to 0.2% in the 81-mg aspirin group. In the 325-mg group, two patients had wound-related bleeding and lower GI bleeding, and one had upper GI bleeding. In the 81-mg group, one patient had wound hematoma, and two patients had upper GI bleeding. Javed Parvizi et al[89] conducted a study in patients

undergoing TJA comparing two doses of aspirin as DVT prophylaxis agent. 0.3% patients had incidence of GI bleeding (major bleeding) in 81mg group and 0.4% patients in 325mg aspirin group had incidence of GI bleeding. Abiram Bala et al[90] conducted a study comparing various agents for DVT prophylaxis following TKA. At 90 days, there was no difference in incidence of bleeding related complications. For aspirin (1.2%), factor Xa inhibitors (1.4%), enoxaparin (LMWH) (1.5%) and warfarin (1.5%). Guy Cafri et al[91] conducted a study to compare various VTE prophylaxis agents following TKA. 3.15% patients taking aspirin, 4.03% patients taking fondaparinux , 2.59% taking enoxaparin (LMWH) and 3% taking warfarin had major bleeding. Janet Chu et al[92] compared risk of VTE with aspirin and other anticoagulants.0.66% patients taking aspirin. 0.87% patients taking anticoagulant and 1.32% patients taking both aspirin and anticoagulants had post operative GI bleeding/hematoma. Yue Zou et al[96] conducted a study to compare the efficacy and safety of aspirin, rivaroxaban and low-molecular-weight heparin (LMWH) for post total knee arthroplasty. It concluded that 4.9% patients taking oral rivaroxaban, 2.67% taking LMWH, 1.82% taking aspirin had wound complications.

Readmission Following TKA: In our study, six patients out of 166 (3.6%) were readmitted to hospital in follow up period. Out of which two patients were readmitted for contralateral TKA, one for increased creatinine, one for distal femur fracture (periprothetic) managed with distal femur plating, one for ankle arthrodesis (done for talo-navicular degeneration), one for difficulty in breathing which was diagnosed as COVID-19. There were two unplanned visits to hospital which did not result in readmission in follow up period. One was for body ache and one for pain and stiffness operated limb.

Four patients had re-surgery in follow up period .Out of which two patients underwent contra lateral TKA, one for distal femur fracture (periprothetic) managed with distal femur plating, one for ankle arthrodesis (done for talo-navicular degeneration).

We reported all cause 30 days readmission rate and 90 days readmission rate to be zero in our study.

Shawn S Richardson et al[85] conducted a study to compare pharmacologic prophylaxis in prevention of venous thromboembolism following total knee arthroplasty and found that 90 day readmission rate to be 8.58% for aspirin , 8.02% for LMWH, 7.14% for warfarin, 7.07% for factor Xa inhibitors and 6.69% for fondaparinux. Mhamad Faour et al[86] concluded that 90 day mortality for patients taking 81mg aspirin and 325mg aspirin was 0.1%. Janet Chu et al[92] conducted a study to compare aspirin and other anticoagualants and found 30 day readmission rate to be 0.17% for patients taking aspirin, 0.20% for patients taking anticoagulants and 0.14% for patients taking both aspirin and anticoagulants. Mark W Gesell[98] conducted a study and concluded that 90 day readmission rate was 1.7% for patients receiving LMWH and also for multimodal anticoagulation. Seon Woo Lee et al[101] studied readmission rates following TKA and found that the overall unplanned readmission rate was 3.3% (n = 101) within 90 days. The majority of readmissions involved arthroplasty-related causes; the most common cause being wound problems, accounting for 24% (24/101) and hypertension were identified as risk factors for unplanned readmissions after TKA. William W. Schairer et al[102] conducted a study to understand the cause and rates of readmission after TKA. The unplanned readmission rate was 8% at 90 days. Approximately three fourths of readmissions were the result of surgical causes, mostly infection, arthrofibrosis, and cellulitis, whereas the remainder of readmissions were the result of medical causes. Xavier Cassard et al[103] conducted a study on 30 day readmission rate following TKA. The rate was 3.3% (2/61) in the outpatient group and 4.9% (25/513) in the inpatient group. The reasons for readmission in the outpatients were knee pain on in one patient and a febrile episode unrelated to the surgery in the other. In the inpatient group, the most common complications were medical, although surgical complications were recorded also .The number of patients who visited the emergency room during the first 30 days but did not require admission was three (4.8%) in the outpatient group (one case each of haematoma, pain,

and epis-taxis) and 12 (2.4%) in the inpatient group (surgical complications,n = seven; medical complications, n = five) .

Mortality: Alexander J. Rondon[79] in 2019 conducted a study in which all cause 90 day mortality was 0.17 % in aspirin group. Mhamad Faour et al[86] conducted a study comparing two regimens of aspirin as DVT prophylaxis agent and found 90 day mortality rate to be similar in both groups (0.1%). Javed Parvizi et al[89] conducted a study in patients undergoing TJA comparing two doses of aspirin as DVT prophylaxis agent. One patient in 81mg group and three patients in 325mg aspirin group had 90 day mortality. Mark W Gesell[98] conducted a study and concluded that 90 day mortality rate was 0.1% for patients receiving LMWH. Yoann Lévy et al[104] studied early morbidity and mortality after single-stage bilateral TKR and concluded 90 day mortality rate to be zero. Nicholas Yohe et al[105] studied complications and readmissions after TKA in octogenarians and nonagenarians and found overall 30-day mortality rate of 0.2% for all patients undergoing primary TKA.

In our study, we reported 30 days mortality and 90 days mortality rate to be zero.

One year mortality rate in our study was 0.006 with 1/166 mortality due to COVID -19 illness.

In our study we followed a protocol and combined regime for DVT prophylaxis was given. Patients were given low molecular weight heparin (LMWH) that is Enoxaparin 40mg once daily subcutaneously during hospital stay and physical therapy was started on first postoperative day. Patients were started on tab Aspirin 150mg once daily for four weeks at discharge.

Majority of our patient cohort predominantly comprised of high risk patients because of which we opted for LMWH in the inpatient setting. Patients in our study were in their sixth and seventh decade of life. Mean age of patients was 63.0 years with a range of 37-87 years. Higher age had increased risk of DVT. Out of 166 patients, majority of patients had BMI in higher ranges of overweight .Mean BMI of all patients was 25.6 with a range of 22-29.9. In our study 69% of the patients had their BMI >25 which also increases the risk of post

operative symptomatic DVT. 93 out of 166 patients underwent bilateral TKA whereas 73 underwent unilateral TKA. The risk of DVT is more in bilateral TKA due to increased intra operative time, prolonged need for hypotensive epidural anaesthesia and procedure related risks.

Hypertension was the most common comorbidity in our patients with 50.6% (n=84) of patients suffering from it. 22.3% (n=37) patients suffered from diabetes mellitus and 10.8% patients had coronary artery disease. 57.8% (n=96) of patients suffered from comorbidities. Majority of patients belonged to Charnley Class B highlighting the high incidence of either the need for arthroplasty in a joint other than that being replaced or association with co-morbidity in patients undergoing TKA. Majority of patients in our study group had Charlson comorbidity scores from 2-4(88.5%) indicating the moderate severity of associated co-morbidity .Another 6.6% patients had scores more than 5 whereas 8 subjects had score <2.

So a combined regime protocol was followed in view of the high risk factors in our study.

This protocol allows DVT prophylaxis with LMWH in the immediate post operative period while relying on efficacy of aspirin for extended DVT prophylaxis after discharge. This protocol has higher patient compliance and a better safety profile. Our study shows that this protocol is efficacious in preventing DVT/PE after TKA while keeping the wound complications to a minimum.

Rate of unplanned visits to hospital, need for readmission, need for re-surgery/any surgery and mortality is also very less in our study. There was only one mortality in our study which was COVID-19 related. Compliance with oral thromboprophylaxis is better than with injectable thromboprophylaxis and the use of aspirin for VTE prophylaxis would afford significant financial benefits being inexpensive, predictable pharmacokinetics, less wound related complications and easy access over the counter. There is also added beneficial cardioprotective effect of this drug.

LIMITATION OF OUR STUDY:

Number of patients in our study are less. More trials involving larger number of patients would be required to confirm the findings of our study to determine the efficacy of aspirin.

Our study recommends the use of aspirin as extended thromboprophylaxis agent for TKA patients for 4 weeks after discharge from hospital in patients who received low molecular weight heparin (LMWH) for post-operative in hospital period. It is safe and efficacious with no DVT/PE cases and minimum complications.

SUMMARY AND CONCLUSIONS

Majority of patients in our study were in their sixth and seventh decade of life. Mean age of patients was 63.0 years with a range of 37-87 years. Higher age had increased risk of DVT.

Out of the 166 patients studied, 114 patients were females whereas 52 patients were male. In patients undergoing TKA females predominate males.

Out of 166 patients, majority of patients had BMI in higher ranges of overweight. Mean BMI of all patients was 25.6 with a range of 22-29.9. In our study 69% of the patients had their BMI >25 which also increases the risk of post operative symptomatic DVT.

93 out of 166 patients underwent bilateral TKA whereas 73 underwent unilateral TKA making it total of 259 operated knees. The risk of DVT is more in bilateral TKA due to increased intra operative time, prolonged need for hypotensive epidural anaesthesia and procedure related risks.

57.8% (n=96) patients suffered from comorbidities. Hypertension was the most common comorbidity in our patients with 50.6% (n=84) of patients suffering from it. 22.3% (n=37) patients suffered from Diabetes mellitus and 10.8% (n=18) patients suffered from Coronary artery disease.

Majority of patients belonged to Charnley class B highlighting the high incidence of either the need for arthroplasty in a joint other than that that being replaced or association with co-morbidity in patient undergoing TKA.

Majority of patients in our study group had Charlson comorbidity scores from 2-4(88.5%) indicating the moderate severity of associated co-morbidity .Another 6.6% patients had scores more than 5 whereas 8 subjects had score <2.

In our study , none of the patients had signs or symptoms like localized tenderness along the deep venous system, entire leg swollen, calf swelling >3cm on asymptomatic side, pitting oedema confined to symptomatic leg, collateral superficial veins, haemoptysis,

breathlessness, pain in calf and thigh, homan's sign suggestive of DVT/PE in post operative period in study.

Our study reported modified Well's score for DVT to be zero in all 166 patients.

16 patients in the study had immediate post operative modified Well's score for PE of 1.5 due to heart rate >100 while 150 patients had zero modified Well's score. Range of Well's Score for PE was 0-1.5 and average modified Well's score for PE is 0.144.

Doppler of bilateral lower limb and CT pulmonary angiography was not required in any patient as the Well's score for DVT and PE was less than two and less than four respectively for DVT and PE.

In our study, 10 out of 166 (6.02%) patients had bleeding from wound site / wound hematoma which resolved with aseptic dressings and prolonged administration of oral antibiotics. There was no need of any surgical intervention of any wound complications / infection.

We reported all cause 30 days readmission rate and 90 days readmission rate to be zero in our study.

One year mortality rate in our study was 0.006 with 1/166 mortality due to COVID -19 illness.

This protocol allows DVT prophylaxis with LMWH in the immediate post operative period while relying on efficacy of aspirin for extended DVT prophylaxis after discharge. This protocol has higher patient compliance and a better safety profile. Our study shows that this protocol is efficacious in preventing DVT/PE after TKA while keeping the wound complications to a minimum.

Compliance with oral thromboprophylaxis is better than with injectable thromboprophylaxis and the use of aspirin for VTE prophylaxis would afford significant financial benefits being inexpensive, predictable pharmacokinetics, less wound related complications and easy access over the counter. There is also added beneficial cardio protective effect of this drug.

Our study recommends the use of aspirin as extended thromboprophylaxis agent for TKA patients for 4 weeks after discharge from hospital in patients who recieved low molecular

weight heparin (LMWH) for post operative in hospital period. It is safe and efficacious with no DVT/PE cases and minimum complications.

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S No.	MRD No	Date	Initials	Age(yrs)	Gender	Occupation	BMI	Diagnosis	Knee Involved	Side of proposed TKA	Duration of complaints	Duration	Under Treatment	Duration	Under Treatment	Duration	Under Treatment	Smoking	Cancer	Obesity	Inactivity & Immobilisation	FAMILY HISTORY OF PRIOR VTE/ ANTICOAGULANT USE	INTRAVENOUS DRUG USE	HORMONAL REPLACEMENT THERAPY
												Hypertension		Diabetes Mellitus		Coronary artery								
1	612008	1/2/2019	SS	74	MALE	RETIRED	27.6	OA	BILATERAL	RIGHT	5-10YRS	5 YRS	YES	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
2	627300	1/3/2019	SS	68	MALE	DEPENDENT	26.4	OA	BILATERAL	BILATERAL	5-10YRS	10 YRS	YES	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
3	112261	1/6/2019	S	65	FEMALE	DEPENDENT	26.5	OA	LEFT	LEFT	<5 YRS	10YRS	YES	10YRS	YES	-	NO	NO	NO	NO	NO	NO	NO	NO
4	562830	1/9/2019	SS	68	MALE	TAILOR	29	OA	LEFT	LEFT	5-10 YRS	5 YRS	YES	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
5	653560	1/16/2019	RS	84	MALE	RETIRED	25.3	OA	RIGHT	RIGHT	5-10 YRS	20YRS	YES	15YRS	YES	-	NO	NO	NO	NO	NO	YES	NO	NO
6	654434	1/23/2019	JK	55	FEMALE	HOUSEWIFE	26.5	OA	BILATERAL	BILATERAL	5-10 YRS	-	NO	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
7	658305	1/24/2019	SD	69	FEMALE	DEPENDENT	22.49	OA	RIGHT	RIGHT	<5 YRS	4.5 YRS	YES	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
8	598194	1/27/2019	S	70	FEMALE	DEPENDENT	25.6	OA	BILATERAL	LEFT	>10 YRS	10YRS	YES	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
9	661445	1/29/2019	GK	59	FEMALE	HOUSEWIFE	25	OA	BILATERAL	BILATERAL	2-5 YRS	-	NO	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
10	655774	2/6/2019	GK	64	FEMALE	HOUSEWIFE	26.5	OA	RIGHT	RIGHT	2-5 YRS	5 YRS	YES	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
11	662912	2/6/2019	SS	71	MALE	RETIRED	25.8	OA	RIGHT	RIGHT	5-10YRS	10 YRS	YES	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
12	669117	2/11/2019	KK	60	FEMALE	HOUSEWIFE	23.5	RA	BILATERAL	BILATERAL	1-2YRS	-	NO	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
13	669129	2/13/2019	AG	71	MALE	BUSSINESS	23.1	OA	BILATERAL	BILATERAL	2-5 YRS	3 YRS	YES	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
14	604224	2/13/2019	JK	50	FEMALE	HOUSEWIFE	23.7	OA	BILATERAL	BILATERAL	2-5 YRS	-	NO	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
15	668548	2/15/2019	AK	62	MALE	RETIRED	29.7	OA	BILATERAL	RIGHT	5-10YRS	7 YRS	YES	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
16	666560	2/15/2019	BS	68	MALE	HOUSEWIFE	27.3	OA	BILATERAL	BILATERAL	5-10YRS	-	NO	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
17	65128	2/18/2019	SK	62	FEMALE	HOUSEWIFE	26.5	OA	RIGHT	RIGHT	2-5 YRS	-	NO	-	NO	-	NO	NO	NO	NO	NO	NO	NO	YES
18	673515	2/18/2019	SS	55	MALE	DEPENDENT	29.07	OA	BILATERAL	BILATERAL	5-10YRS	10YRS	YES	15 YRS	YES	-	NO	NO	NO	NO	NO	NO	NO	NO
19	902861	2/20/2019	R	58	FEMALE	DEPENDENT	25	OA	LEFT	LEFT	2-5 YRS	-	NO	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
20	637269	2/20/2019	GKG	69	MALE	RETIRED	25.93	OA	LEFT	LEFT	5-10YRS	15YRS	YES	12YRS	YES	12YRS	YES	NO	NO	NO	NO	YES	NO	NO
21	8955	2/20/2019	AK	63	FEMALE	DEPENDENT	24.22	OA	RIGHT	RIGHT	2-5 YRS	8YRS	YES	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
22	676138	2/22/2019	BK	55	FEMALE	HOUSEWIFE	27.68	OA	BILATERAL	BILATERAL	2-5 YRS	5YRS	YES	6YRS	YES	-	NO	NO	NO	NO	NO	NO	NO	NO
23	678134	2/25/2019	DK	70	FEMALE	HOUSEWIFE	29.74	OA	LEFT	LEFT	5-10YRS	10YRS	YES	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
24	671270	2/25/2019	JK	55	FEMALE	DEPENDENT	23.9	OA	BILATERAL	BILATERAL	2-5 YRS	-	NO	5YRS	YES	-	NO	NO	NO	NO	NO	NO	NO	NO
25	668943	3/4/2019	NS	66	MALE	RETIRED	25.8	OA	BILATERAL	BILATERAL	2-5 YRS	-	NO	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
26	683282	3/6/2019	AR	64	FEMALE	HOUSEWIFE	28.34	OA	BILATERAL	BILATERAL	5-10YRS	-	NO	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
27	530069	3/6/2019	ST	83	MALE	RETIRED	25.83	OA	RIGHT	RIGHT	>10 YRS	10YRS	YES	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
28	683501	3/6/2019	AA	57	FEMALE	HOUSEWIFE	23.66	OA	BILATERAL	BILATERAL	2-5YRS	-	NO	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
29	687130	3/12/2019	VR	57	FEMALE	WORKING	25.65	OA	BILATERAL	BILATERAL	2-5YRS	-	NO	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
30	539992	3/13/2019	MSG	65	MALE	RETIRED	27.68	OA	BILATERAL	BILATERAL	2-5YRS	10YRS	YES	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
31	687923	3/13/2019	SS	61	MALE	FARMER	25.83	OA	BILATERAL	BILATERAL	2-5YRS	-	NO	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
32	466822	3/14/2019	PS	67	MALE	DEPENDENT	26.4	OA	RIGHT	RIGHT	2-5YRS	12YRS	YES	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
33	689448	3/15/2019	KB	55	FEMALE	HOUSEWIFE	23.2	OA	BILATERAL	BILATERAL	1-2 YRS	-	NO	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
34	679837	3/18/2019	PL	72	FEMALE	HOUSEWIFE	26.4	OA	BILATERAL	BILATERAL	5-10YRS	-	NO	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
35	688934	3/20/2019	RR	67	FEMALE	HOUSEWIFE	22.9	OA	BILATERAL	BILATERAL	2-5YRS	-	NO	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
36	677044	3/22/2019	JS	72	MALE	DEPENDENT	24.9	OA	RIGHT	RIGHT	<1 YRS	-	NO	-	NO	-	NO	NO	NO	NO	NO	YES	NO	NO
37	691738	3/22/2019	SS	40	MALE	BUSSINESS	27.7	OA	RIGHT	RIGHT	1-2YRS	-	NO	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
38	694961	3/27/2019	GS	65	MALE	RETIRED	26.8	OA	BILATERAL	BILATERAL	5-10YRS	-	NO	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
39	374296	3/27/2019	MR	74	MALE	DEPENDENT	25.8	OA	RIGHT	RIGHT	>10YRS	-	NO	15YRS	YES	-	NO	NO	NO	NO	NO	NO	NO	NO
40	697036	3/27/2019	SR	53	FEMALE	HOUSEWIFE	26.67	OA	BILATERAL	BILATERAL	1-2YRS	-	NO	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
41	689746	3/28/2019	SK	55	FEMALE	DEPENDENT	24.2	OA	BILATERAL	LEFT	2-5YRS	-	NO	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
42	704834	4/8/2019	AK	75	FEMALE	HOUSEWIFE	28.3	OA	BILATERAL	BILATERAL	>10YRS	10YRS	YES	8YRS	YES	-	NO	NO	NO	NO	NO	NO	NO	NO
43	704639	4/8/2019	AK	57	FEMALE	HOUSEWIFE	23.1	OA	BILATERAL	BILATERAL	>10YRS	-	NO	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
44	185955	4/12/2019	S	69	FEMALE	HOUSEWIFE	28.2	OA	RIGHT	RIGHT	5-10YRS	10YRS	YES	9YRS	YES	-	NO	NO	NO	NO	NO	YES	NO	NO
45	709421	4/15/2019	ZS	70	MALE	DEPENDENT	25.8	OA	BILATERAL	BILATERAL	5-10YRS	12YRS	YES	12YRS	YES	-	YES	NO	NO	NO	NO	YES	NO	NO
46	708986	4/15/2019	SK	65	FEMALE	RETIRED	26	OA	BILATERAL	BILATERAL	2-5YRS	7YRS	YES	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
47	709583	4/15/2019	GKS	80	MALE	DEPENDENT	26.4	OA	RIGHT	RIGHT	5-10YRS	10YRS	YES	10YRS	YES	5YRS	YES	NO	NO	NO	NO	YES	NO	NO
48	710731	4/17/2019	KR	60	MALE	HOUSEWIFE	23.5	OA	LEFT	LEFT	1-2YRS	-	NO	7YRS	YES	-	NO	NO	NO	NO	NO	NO	NO	NO
49	67727	4/17/2019	JS	58	MALE	DEPENDENT	25	OA	LEFT	LEFT	5-10YRS	-	NO	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
50	26492	4/22/2019	KS	60	FEMALE	HOUSEWIFE	25.4	OA	BILATERAL	BILATERAL	2-5YRS	-	NO	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
51	716614	4/26/2019	M	55	FEMALE	DEPENDENT	27	OA	BILATERAL	BILATERAL	5-10YRS	-	NO	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
52	718165	4/29/2019	VR	58	FEMALE	DOCTOR	26.2	OA	BILATERAL	BILATERAL	2-5YRS	-	NO	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
53	708899	5/4/2019	HK	55	FEMALE	HOUSEWIFE	26.5	OA	BILATERAL	BILATERAL	2-5YRS	5YRS	YES	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
54	722937	5/6/2019	RL	75	MALE	RETIRED	23.1	OA	BILATERAL	RIGHT	>10YRS	-	NO	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
55	655083	5/8/2019	RRA	68	MALE	DEPENDENT	23.8	OA	RIGHT	RIGHT	5-10YRS	-	NO	-	NO	-	NO	NO	NO	NO	NO	YES	NO	NO
56	724465	5/8/2019	JS	53	MALE	BUSSINESS	25.95	OA	LEFT	LEFT	2-5YRS	-	NO	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
57	712246	5/13/2019	SR	60	FEMALE	HOUSEWIFE	-	OA	BILATERAL	BILATERAL	2-5YRS	-	NO	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
58	729824	5/20/2019	KR	42	FEMALE	LABOURER	22.5	OA	BILATERAL	BILATERAL	2-5YRS	-	NO	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
59	731911	5/20/2019	GS	75	MALE	RETIRED	27.2	OA	BILATERAL	BILATERAL	>10YRS	10YRS	YES	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
60	732914	5/26/2019	VW	87	FEMALE	DEPENDENT	27	OA	BILATERAL	LEFT	5-10YRS	13YRS	YES	15YRS	YES	-	NO	NO	NO	NO	NO	NO	NO	NO
61	733272	5/27/2019	RK	37	FEMALE	HOUSEWIFE	24.7	OA	LEFT	LEFT	2-5YRS	-	NO	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
62	689274	5/28/2019	RK	55	FEMALE	HOUSEWIFE	23.5	OA	BILATERAL	BILATERAL	2-5YRS	-	NO	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO

S No.	MRD No	CURRENT MEDICATION	Inflammatory /autoimmune disease	ACTIVE CANCER	Paralysis / Paresis or recent plaster immobilization of lower extremities at Preop/Immediate postop/ Postop period/At 1 mnth/At 3	RECENT BEDRIDDEN FOR 3 DAYS OR MAJOR SURGERY WITH LAST 3 MONTHS	Localized tenderness along the deep venous system at Preop/Immediate postop/ Postop	Entire leg swollen at Preop/Immediate postop/ Postop period/At 1 mnth/At 3 mnth	Calf swelling>3cm larger than asymptomatic side at Preop/Immediate postop/ Postop	Pitting oedema confined to symptomatic leg at Preop/Immediate postop/ Postop	Collateral superficial veins at Preop/Immediate postop/ Postop period/At 1 mnth/At	Previously documented DVT	Alternative diagnosis as likely as DVT at Preop/Immediate postop/ Postop period/At 1 mnth/At	Clinical probablity of DVT Likely/Unlikely at Preop/Immediate postop/ Postop period/At 1 mnth/ At 3 mnth
1	612008	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
2	627300	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
3	112261	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
4	562830	TAB AMLONG 5	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
5	653560	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
6	654434	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
7	658305	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
8	598194	TAB TELMA 40	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
9	661445	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
10	655774	TAB TELMA 40	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
11	662912	TAB RAMIPRIL	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
12	669117	HCQS/LEPRA	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
13	669129	TAB AMLONG 5	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
14	604224	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
15	668548	TAB SARTEL AM	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
16	666560	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
17	65128	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
18	673515	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
19	902861	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
20	637269	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
21	8955	TAB TELMA 40	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
22	676138	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
23	678134	TAB TELMA 40	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
24	671270	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
25	668943	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
26	683282	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
27	530069	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
28	683501	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
29	687130	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
30	539992	HTN/THYROID	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
31	687923	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
32	466822	TB TELMA 40	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
33	689448	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
34	679837	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
35	688934	FOR ASTHMA	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
36	677044	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
37	691738	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
38	694961	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
39	374296	GLYMET 1/2 BD	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
40	697036	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
41	689746	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
42	704834	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
43	704639	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
44	185955	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
45	709421	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
46	708986	TB AMLONG MT	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
47	709583	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
48	710731	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
49	67727	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
50	26492	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
51	716614	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
52	718165	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
53	708899	TB AMLONG 5	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
54	722937	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
55	655083	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
56	724465	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
57	712246	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
58	729824	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
59	731911	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
60	732914	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
61	733272	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
62	689274	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY

S No.	MRD No	Clinical signs and symptoms of DVT at Preop/Immediate postop/ Postop period/At 1 mnth/ At 3 mnth	PE is #1 Diagnosis or equally likely at Immediate/Post op/At 1 mnth/ At 3 mnth	Heart rate >100? At Immediate Postop	Heart rate >100? At Postop/At 1 mnth/At 3 mnth	Immobilization at least 3 days or surgery in previous 4 weeks previously objectively diagnosed as PE or DVT at Immediate/Post op/At 1 mnth/ At 3 mnth	Hemoptysis? at Immediate/Post op/At 1 mnth/ At 3 mnth	Malignancy with treatment within 6 months or palliative at Immediate/Post op/At 1 mnth/ At 3 mnth	PE likely/unlikely at Immediate/Post op/At 1 mnth/ At 3 mnth	Dyspnoea	Chest Pain	Bleeding from wound site/ wound hematoma	Upper GI bleed	Lower GI bleed	Mortality	Length of stay (days)	Readmission
1	612008	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	6	NO
2	627300	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
3	112261	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	6	NO
4	562830	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	YES	NO	NO	NO	7	NO
5	653560	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	6	NO
6	654434	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	YES
7	658305	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	YES	NO	NO	NO	7	NO
8	598194	NO	NO	YES	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	6	NO
9	661445	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
10	655774	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	6	NO
11	662912	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	6	NO
12	669117	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
13	669129	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	8	NO
14	604224	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
15	668548	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	6	NO
16	666560	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
17	65128	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	6	NO
18	673515	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
19	902861	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	YES	NO	NO	NO	6	NO
20	637269	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	6	NO
21	8955	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	6	NO
22	676138	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
23	678134	NO	NO	YES	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
24	671270	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
25	668943	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	YES
26	683282	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	YES
27	530069	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
28	683501	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
29	687130	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	YES	NO	NO	NO	7	NO
30	539992	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
31	687923	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
32	466822	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	6	NO
33	689448	NO	NO	YES	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
34	679837	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
35	688934	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
36	677044	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
37	691738	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	6	NO
38	694961	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
39	374296	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
40	697036	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
41	689746	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	6	NO
42	704834	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
43	704639	NO	NO	YES	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
44	185955	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	6	NO
45	709421	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
46	708986	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	10	NO
47	709583	NO	NO	YES	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	6	NO
48	710731	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	6	NO
49	67727	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	6	NO
50	26492	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
51	716614	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
52	718165	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
53	708899	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
54	722937	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	6	NO
55	655083	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
56	724465	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	6	NO
57	712246	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
58	729824	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
59	731911	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	YES	NO	NO	NO	7	NO
60	732914	NO	NO	YES	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	6	NO
61	733272	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	6	NO
62	689274	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO

S No.	MRD No	Major bleeding	Minor Bleeding	Resurgery/any surgery	History of fall	Unplanned visit to hospital	Charlson Comorbidity Index	Charnley Classification
1	612008	NO	NO	NO	NO	NO	4	B1
2	627300	NO	NO	NO	NO	NO	3	B2
3	112261	NO	NO	NO	NO	NO	3	A
4	562830	NO	NO	NO	NO	NO	3	A
5	653560	NO	NO	NO	NO	NO	4	A
6	654434	NO	NO	ANKLE ARTHRODESIS	NO	NO	2	B2
7	658305	NO	NO	NO	NO	NO	3	A
8	598194	NO	NO	NO	NO	YES BODYACHES	4	B1
9	661445	NO	NO	NO	NO	NO	2	B2
10	655774	NO	NO	NO	NO	NO	3	A
11	662912	NO	NO	NO	NO	NO	4	A
12	669117	NO	NO	NO	NO	NO	2	B2
13	669129	NO	NO	NO	NO	NO	4	B2
14	604224	NO	NO	NO	NO	NO	2	B2
15	668548	NO	NO	NO	NO	NO	3	B1
16	666560	NO	NO	NO	NO	NO	4	B2
17	65128	NO	NO	NO	NO	NO	3	A
18	673515	NO	NO	NO	NO	NO	3	B2
19	902861	NO	NO	NO	NO	NO	2	A
20	637269	NO	NO	NO	NO	NO	4	A
21	8955	NO	NO	NO	NO	NO	3	A
22	676138	NO	NO	NO	NO	NO	2	B2
23	678134	NO	NO	NO	NO	NO	3	A
24	671270	NO	NO	NO	NO	NO	3	B2
25	668943	NO	NO	DISTAL FEMUR PLATING	YES	YES	3	B2
26	683282	NO	NO	NO	NO	YES INC CREATININE	3	B1
27	530069	NO	NO	NO	NO	NO	4	A
28	683501	NO	NO	NO	NO	NO	2	B2
29	687130	NO	NO	NO	NO	NO	2	B2
30	539992	NO	NO	NO	NO	NO	3	B2
31	687923	NO	NO	NO	NO	NO	3	B2
32	466822	NO	NO	NO	NO	NO	3	A
33	689448	NO	NO	NO	NO	NO	2	B2
34	679837	NO	NO	NO	NO	NO	4	B2
35	688934	NO	NO	NO	NO	NO	3	B2
36	677044	NO	NO	NO	NO	NO	4	A
37	691738	NO	NO	NO	NO	NO	0	A
38	694961	NO	NO	NO	NO	NO	3	B2
39	374296	NO	NO	NO	NO	NO	5	A
40	697036	NO	NO	NO	NO	NO	2	B2
41	689746	NO	NO	NO	NO	NO	2	B1
42	704834	NO	NO	NO	NO	NO	5	B2
43	704639	NO	NO	NO	NO	NO	2	B2
44	185955	NO	NO	NO	NO	NO	4	A
45	709421	NO	NO	NO	NO	NO	4	B2
46	708986	NO	NO	NO	NO	NO	4	B2
47	709583	NO	NO	NO	NO	NO	5	A
48	710731	NO	NO	NO	NO	NO	3	A
49	67727	NO	NO	NO	NO	NO	2	A
50	26492	NO	NO	NO	NO	NO	2	B2
51	716614	NO	NO	NO	NO	NO	2	B2
52	718165	NO	NO	NO	NO	NO	2	B2
53	708899	NO	NO	NO	NO	NO	2	B2
54	722937	NO	NO	NO	NO	NO	4	B1
55	655083	NO	NO	NO	NO	NO	3	A
56	724465	NO	NO	NO	NO	NO	2	A
57	712246	NO	NO	NO	NO	NO	2	B2
58	729824	NO	NO	NO	NO	NO	1	B2
59	731911	NO	NO	NO	NO	NO	4	B2
60	732914	NO	NO	NO	NO	NO	5	B1
61	733272	NO	NO	NO	NO	NO	0	A
62	689274	NO	NO	NO	NO	NO	2	B2

S No.	MRD No	Date	Initials	Age(yrs)	Gender	Occupation	BMI	Diagnosis	Knee Involved	Side of proposed TKA	Duration of complaints	Duration	Under Treatment	Duration	Under Treatment	Duration	Under Treatment	Smoking	Cancer	Obesity	Inactivity & Immobilisation	FAMILY HISTORY OF PRIOR VTE/ ANTICOAGULANT USE	INTRAVENOUS DRUG USE	HORMONAL REPLACEMENT THERAPY
												Hypertension		Diabetes Mellitus		Coronary artery								
63	738269	5/30/2019	JK	78	FEMALE	DEPENDENT	27.2	OA	RIGHT	RIGHT	5-10YRS	10YRS	NO	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
64	739582	5/30/2019	BK	75	FEMALE	HOUSEWIFE	26.2	OA	LEFT	LEFT	2-5YRS	5YRS	YES	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
65	74142	6/3/2019	JK	65	FEMALE	HOUSEWIFE	26	OA	BILATERAL	BILATERAL	2-5YRS	5YRS	YES	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
66	5656415	6/3/2019	GK	70	FEMALE	HOUSEWIFE	24.2	OA	LEFT	LEFT	5-10YRS	10YRS	YES	-	NO	-	YES	NO	NO	NO	NO	YES	NO	NO
67	741372	6/3/2019	HS	62	MALE	RETIRED	25.8	OA	LEFT	LEFT	5-10YRS	10YRS	YES	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
68	598957	6/3/2019	RK	47	MALE	BUSSINESS	26	OA	LEFT	LEFT	2-5YRS	<1 YR	YES	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
69	743852	6/7/2019	SK	64	FEMALE	HOUSEWIFE	26.2	OA	BILATERAL	BILATERAL	5-10YRS	8YRS	YES	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
70	744055	6/7/2019	U	64	FEMALE	DEPENDENT	24.5	OA	LEFT	LEFT	5-10YRS	7YRS	YES	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
71	621095	6/10/2019	VV	65	MALE	DEPENDENT	25.4	OA	LEFT	LEFT	5-10YRS	10YRS	YES	-	NO	2YRS	YES	NO	NO	NO	NO	YES	NO	NO
72	747187	6/12/2019	GK	57	MALE	HOUSEWIFE	26.5	OA	BILATERAL	BILATERAL	2-5YRS	-	NO	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
73	713380	6/12/2019	AR	50	FEMALE	DEPENDENT	25.9	OA	LEFT	LEFT	2-5YRS	3 YRS	YES	3YRS	YES	-	NO	NO	NO	NO	NO	NO	NO	NO
74	749344	6/17/2019	SD	70	FEMALE	HOUSEWIFE	27.7	OA	LEFT	LEFT	5-10YRS	12YRS	YES	-	NO	7YRS	YES	NO	NO	NO	NO	YES	NO	NO
75	659530	6/18/2019	KS	69	FEMALE	HOUSEWIFE	27.7	OA	BILATERAL	LEFT	5-10YRS	10YRS	YES	12YRS	YES	-	NO	NO	NO	NO	NO	NO	NO	NO
76	6680	6/18/2019	NS	59	FEMALE	HOUSEWIFE	22.2	OA	BILATERAL	BILATERAL	2-5 YRS	-	NO	5 YRS	YES	-	NO	NO	NO	NO	NO	NO	NO	NO
77	752388	6/21/2019	RR	66	FEMALE	DEPENDENT	26.8	OA	BILATERAL	BILATERAL	5-10 YRS	10YRS	YES	12YRS	YES	2 MONTH	YES	NO	NO	NO	NO	YES	NO	NO
78	754147	6/24/2019	SB	60	FEMALE	HOUSEWIFE	25.6	OA	BILATERAL	BILATERAL	2-5 YRS	10YRS	YES	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
79	754163	6/24/2019	SK	66	FEMALE	HOUSEWIFE	24.9	OA	BILATERAL	BILATERAL	5-10YRS	7YRS	YES	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
80	755844	6/27/2019	MK	60	FEMALE	HOUSEWIFE	25.6	OA	BILATERAL	BILATERAL	5-10YRS	-	NO	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
81	758892	7/1/2019	SG	60	FEMALE	HOUSEWIFE	25.6	OA	BILATERAL	BILATERAL	2-5YRS	10YRS	YES	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
82	756127	7/2/2019	VK	65	MALE	RETIRED	27	OA	BILATERAL	BILATERAL	5-10YRS	10YRS	YES	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
83	759561	7/2/2019	CK	53	FEMALE	HOUSEWIFE	25.7	OA	BILATERAL	BILATERAL	1-2YRS	-	NO	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
84	769219	7/17/2019	RK	51	FEMALE	HOUSEWIFE	26.9	OA	BILATERAL	BILATERAL	2-5YRS	-	NO	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
85	40401	7/18/2019	KB	60	FEMALE	HOUSEWIFE	26.6	OA	BILATERAL	BILATERAL	2-5YRS	5YRS	YES	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
86	770754	7/19/2019	SK	44	FEMALE	HOUSEWIFE	26	OA	RIGHT	BILATERAL	2-5YRS	-	NO	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
87	324524	7/22/2019	GK	70	FEMALE	HOUSEWIFE	25.6	OA	BILATERAL	BILATERAL	>10YRS	-	NO	10YRS	YES	2YRS	YES	NO	NO	NO	NO	YES	NO	NO
88	772586	7/22/2019	UR	59	FEMALE	HOUSEWIFE	25.6	OA	BILATERAL	BILATERAL	2-5YRS	-	NO	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
89	775469	7/26/2019	PG	62	FEMALE	HOUSEWIFE	25.7	OA	BILATERAL	BILATERAL	2-5YRS	10YRS	YES	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
90	779668	8/1/2019	BK	61	FEMALE	DEPENDENT	26.3	OA	BILATERAL	BILATERAL	2-5YRS	-	NO	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
91	772875	8/2/2019	SK	61	FEMALE	HOUSEWIFE	25.6	OA	BILATERAL	BILATERAL	2-5YRS	-	NO	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
92	159956	8/7/2019	BD	57	FEMALE	HOUSEWIFE	23.1	OA	BILATERAL	BILATERAL	2-5YRS	-	NO	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
93	580202	8/7/2019	RS	66	MALE	DEPENDENT	25.8	OA	LEFT	LEFT	2-5YRS	10YRS	YES	-	NO	8YRS	YES	NO	NO	NO	NO	YES	NO	NO
94	744380	8/7/2019	IS	70	MALE	RETIRED	24.4	OA	RIGHT	RIGHT	5-10YRS	10YRS	YES	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
95	784834	8/9/2019	RC	76	MALE	RETIRED	26.98	OA	BILATERAL	BILATERAL	5-10YRS	15YRS	YES	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
96	787246	8/21/2019	BS	68	MALE	RETIRED	24.9	OA	BILATERAL	BILATERAL	2-5YRS	10YRS	YES	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
97	138382	8/21/2019	BK	56	FEMALE	HOUSEWIFE	25.8	OA	LEFT	LEFT	2-5YRS	-	NO	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
98	21651	8/23/2019	AKJ	67	FEMALE	DEPENDENT	23.3	OA	RIGHT	RIGHT	5-10YRS	12YRS	YES	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
99	612008	8/26/2019	SS	74	MALE	DEPENDENT	27.1	OA	LEFT	LEFT	>10YRS	15YRS	YES	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
100	397206	9/2/2019	PK	61	FEMALE	HOUSEWIFE	23.4	OA	BILATERAL	LEFT	1-2YRS	-	NO	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
101	771922	9/3/2019	SJ	60	FEMALE	HOUSEWIFE	27.8	OA	BILATERAL	BILATERAL	2-5YRS	-	NO	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
102	804726	9/7/2019	DK	69	FEMALE	HOUSEWIFE	25.6	OA	BILATERAL	BILATERAL	>10 YRS	15YRS	YES	15YRS	YES	-	NO	NO	NO	NO	NO	NO	NO	NO
103	805991	9/9/2019	MG	71	MALE	DEPENDENT	25.7	OA	BILATERAL	BILATERAL	>10 YRS	16YRS	YES	2OYRS	YES	-	NO	NO	NO	NO	NO	NO	NO	NO
104	301190	9/11/2019	PK	69	FEMALE	DEPENDENT	26.1	OA	BILATERAL	LEFT	5-10YRS	10YRS	YES	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
105	63111	9/11/2019	RK	73	FEMALE	HOUSEWIFE	25	OA	BILATERAL	BILATERAL	>10 YRS	15YRS	YES	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
106	78815	9/16/2019	SK	62	FEMALE	HOUSEWIFE	26.3	OA	BILATERAL	BILATERAL	2-5YRS	5YRS	YES	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
107	809133	9/18/2019	RK	54	FEMALE	HOUSEWIFE	25.5	OA	BILATERAL	BILATERAL	2-5YRS	-	NO	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
108	807480	9/18/2019	GK	61	FEMALE	HOUSEWIFE	26.3	OA	BILATERAL	BILATERAL	2-5YRS	-	NO	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
109	722937	9/18/2019	RL	75	MALE	DEPENDENT	25.7	OA	LEFT	LEFT	5-10YRS	15YRS	YES	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
110	814242	9/20/2019	VR	68	FEMALE	HOUSEWIFE	26.3	OA	LEFT	LEFT	5-10YRS	-	NO	7YRS	YES	-	NO	NO	NO	NO	NO	NO	NO	NO
111	807822	9/20/2019	CK	67	FEMALE	DEPENDENT	24.2	OA	BILATERAL	RIGHT	5-10YRS	10YRS	YES	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
112	797695	9/23/2019	VL	57	FEMALE	HOUSEWIFE	23.8	OA	BILATERAL	BILATERAL	2-5YRS	-	NO	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
113	815666	9/25/2019	SR	65	MALE	RETIRED	25.8	OA	LEFT	LEFT	2-5YRS	7YRS	YES	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
114	113838	9/29/2019	MS	68	MALE	RETIRED	26.4	OA	BILATERAL	BILATERAL	5-10YRS	10YRS	YES	12YRS	YES	-	YES	NO	NO	NO	NO	YES	NO	NO
115	819731	9/30/2019	CK	50	FEMALE	HOUSEWIFE	27	OA	BILATERAL	BILATERAL	2-5YRS	-	NO	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
116	279242	9/30/2019	MS	67	MALE	RETIRED	25.7	OA	BILATERAL	BILATERAL	2-5YRS	5YRS	YES	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
117	822013	10/2/2019	KK	48	FEMALE	HOUSEWIFE	22	OA	BILATERAL	LEFT	2-5YRS	-	NO	10YRS	YES	-	NO	NO	NO	NO	NO	NO	NO	NO
118	754163	10/4/2019	SK	66	FEMALE	HOUSEWIFE	24.3	OA	LEFT	LEFT	5-10YRS	-	NO	-	NO	-	NO	NO	BREAST	NO	NO	NO	NO	NO
119	796655	10/4/2019	KK	52	FEMALE	HOUSEWIFE	24.2	OA	LEFT	LEFT	2-5YRS	-	NO	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
120	543344	10/6/2019	MK	64	FEMALE	HOUSEWIFE	24.4	RA	BILATERAL	BILATERAL	5-10YRS	-	NO	-	NO	-	NO	NO	BREAST	NO	NO	NO	NO	YES
121	825905	10/9/2019	JK	70	FEMALE	HOUSEWIFE	27	OA	BILATERAL	BILATERAL	>10YRS	15YRS	YES	-	NO	3YRS	YES	NO	NO	NO	NO	YES	NO	NO
122	826901	10/10/2019	A	67	FEMALE	HOUSEWIFE	26.4	OA	BILATERAL	BILATERAL	5-10YRS	15YRS	YES	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
123	827771	10/11/2019	PK	51	FEMALE	DEPENDENT	25.7	OA	RIGHT	RIGHT	2-5YRS	-	NO	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
124	833788	10/21/2019	GK	53	FEMALE	HOUSEWIFE	27	OA	BILATERAL	BILATERAL	2-5YRS	-	NO	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO

S No.	MRD No	CURRENT MEDICATION	Inflammatory /autoimmune disease	ACTIVE CANCER	Paralysis / Paresis or recent plaster immobilization of lower extremities at Preop/Immediate postop/ Postop period/At 1 mnth/At 3	RECENT BEDRIDDEN FOR 3 DAYS OR MAJOR SURGERY WITH LAST 3 MONTHS	Localized tenderness along the deep venous system at Preop/Immediate postop/ Postop	Entire leg swollen at Preop/Immediate postop/ Postop period/At 1 mnth/At 3 mnth	Calf swelling>3cm larger than asymptomatic side at Preop/Immediate postop/ Postop	Pitting oedema confined to symptomatic leg at Preop/Immediate postop/ Postop	Collateral superficial veins at Preop/Immediate postop/ Postop period/At 1 mnth/At	Previously documented DVT	Alternative diagnosis as likely as DVT at Preop/Immediate postop/ Postop period/At 1 mnth/At	Clinical probablity of DVT Likely/Unlikely at Preop/Immediate postop/ Postop period/At 1 mnth/ At 3 mnth
63	738269	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
64	739582	TB AMLONG 5	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
65	74142	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
66	5656415	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
67	741372	TB TEMLA H	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
68	598957	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
69	743852	TB TELMA 40	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
70	744055	TB TELMAKIND	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
71	621095	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
72	747187	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
73	713380	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
74	749344	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
75	659530	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
76	6680	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
77	752388	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
78	754147	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
79	754163	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
80	755844	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
81	758892	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
82	756127	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
83	759561	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
84	769219	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
85	40401	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
86	770754	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
87	324524	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
88	772586	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
89	775469	TB TELMA 40	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
90	779668	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
91	772875	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
92	159956	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
93	580202	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
94	744380	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
95	784834	HTN $ SZ D/O	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
96	787246	TB TELMA 40	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
97	138382	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
98	21651	AMLONG 10mg	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
99	612008	AMLONG 5mg	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
100	397206	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
101	771922	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
102	804726	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
103	805991	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
104	301190	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
105	63111	TB TELMA H	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
106	78815	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
107	809133	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
108	807480	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
109	722937	TB AMLONG MT	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
110	814242	TB GLYMET SR	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
111	807822	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
112	797695	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
113	815666	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
114	113838	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
115	819731	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
116	279242	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
117	822013	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
118	754163	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
119	796655	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
120	543344	YES	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
121	825905	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
122	826901	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
123	827771	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
124	833788	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY

S No.	MRD No	Clinical signs and symptoms of DVT at Preop/Immediate postop/ Postop period/At 1 mnth/ At 3 mnth	PE is #1 Diagnosis or equally likely at Immediate/Post op/At 1 mnth/ At 3 mnth	Heart rate >100? At Immediate Postop	Heart rate >100? At Postop/At 1 mnth/At 3 mnth	Immobilization at least 3 days or surgery in previous 4 weeks previously objectively diagnosed as PE or DVT at Immediate/Post op/At 1 mnth/ At 3 mnth	Hemoptysis? at Immediate/Post op/At 1 mnth/ At 3 mnth	Malignancy with treatment within 6 months or palliative at Immediate/Post op/At 1 mnth/ At 3 mnth	PE likely/unlikely at Immediate/Post op/At 1 mnth/ At 3 mnth	Dyspnoea	Chest Pain	Bleeding from wound site/ wound hematoma	Upper GI bleed	Lower GI bleed	Mortality	Length of stay (days)	Readmission
63	738269	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	6	NO
64	739582	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	6	NO
65	74142	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
66	5656415	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	6	NO
67	741372	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	6	NO
68	598957	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	6	NO
69	743852	NO	NO	YES	NO	NO	NO	NO	UNLIKELY	NO	NO	YES	NO	NO	NO	7	NO
70	744055	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	6	NO
71	621095	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	6	NO
72	747187	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
73	713380	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	6	NO
74	749344	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	6	NO
75	659530	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	6	NO
76	6680	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
77	752388	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
78	754147	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
79	754163	NO	NO	YES	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	6	NO
80	755844	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
81	758892	NO	NO	YES	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
82	756127	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
83	759561	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
84	769219	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
85	40401	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	YES	NO	NO	NO	7	NO
86	770754	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	6	NO
87	324524	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
88	772586	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
89	775469	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
90	779668	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
91	772875	NO	NO	YES	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
92	159956	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
93	580202	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	6	NO
94	744380	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	6	NO
95	784834	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
96	787246	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
97	138382	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	YES	NO	NO	NO	6	NO
98	21651	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	6	NO
99	612008	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	6	NO
100	397206	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	6	NO
101	771922	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	6	NO
102	804726	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
103	805991	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	8	NO
104	301190	NO	NO	YES	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	6	NO
105	63111	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
106	78815	NO	NO	YES	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
107	809133	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
108	807480	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
109	722937	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	YES (SEPT1	6	YES
110	814242	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	YES	NO	NO	NO	6	NO
111	807822	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
112	797695	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
113	815666	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	6	NO
114	113838	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
115	819731	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
116	279242	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	6	NO
117	822013	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	6	NO
118	754163	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	6	NO
119	796655	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	6	NO
120	543344	NO	NO	YES	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
121	825905	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
122	826901	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
123	827771	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	6	NO
124	833788	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO

S No.	MRD No	Major bleeding	Minor Bleeding	Resurgery/any surgery	History of fall	Unplanned visit to hospital	Charlson Comorbidity Index	Charnley Classification
63	738269	NO	NO	NO	NO	NO	4	A
64	739582	NO	NO	NO	NO	NO	3	A
65	74142	NO	NO	NO	NO	NO	3	B2
66	5656415	NO	NO	NO	NO	NO	3	A
67	741372	NO	NO	NO	NO	NO	3	A
68	598957	NO	NO	NO	NO	NO	1	A
69	743852	NO	NO	NO	NO	NO	3	B2
70	744055	NO	NO	NO	NO	NO	3	A
71	621095	NO	NO	NO	NO	NO	3	A
72	747187	NO	NO	NO	NO	NO	2	B2
73	713380	NO	NO	NO	NO	NO	1	A
74	749344	NO	NO	NO	NO	NO	3	A
75	659530	NO	NO	NO	NO	NO	4	B1
76	6680	NO	NO	NO	NO	NO	3	B2
77	752388	NO	NO	NO	NO	NO	4	B2
78	754147	NO	NO	NO	NO	NO	2	B2
79	754163	NO	NO	NO	NO	NO	3	B1
80	755844	NO	NO	NO	NO	NO	2	B2
81	758892	NO	NO	NO	NO	NO	2	B2
82	756127	NO	NO	NO	NO	NO	3	B2
83	759561	NO	NO	NO	NO	NO	2	B2
84	769219	NO	NO	NO	NO	NO	2	B2
85	40401	NO	NO	NO	NO	NO	3	B2
86	770754	NO	NO	NO	NO	NO	1	B2
87	324524	NO	NO	NO	NO	NO	4	B2
88	772586	NO	NO	NO	NO	NO	2	B2
89	775469	NO	NO	NO	NO	NO	3	B2
90	779668	NO	NO	NO	NO	NO	3	B2
91	772875	NO	NO	NO	NO	NO	3	B2
92	159956	NO	NO	NO	NO	NO	2	B2
93	580202	NO	NO	NO	NO	NO	3	A
94	744380	NO	NO	NO	NO	NO	3	A
95	784834	NO	NO	NO	NO	NO	4	B2
96	787246	NO	NO	NO	NO	NO	3	B2
97	138382	NO	NO	NO	NO	NO	2	A
98	21651	NO	NO	NO	NO	NO	3	A
99	612008	NO	NO	CONTRALATERAL TKA	NO	YES	4	A
100	397206	NO	NO	NO	NO	NO	3	B1
101	771922	NO	NO	NO	NO	NO	2	B1
102	804726	NO	NO	NO	NO	NO	4	B2
103	805991	NO	NO	NO	NO	NO	5	B2
104	301190	NO	NO	NO	NO	NO	3	B1
105	63111	NO	NO	NO	NO	NO	4	B2
106	78815	NO	NO	NO	NO	NO	3	B2
107	809133	NO	NO	NO	NO	NO	2	B2
108	807480	NO	NO	NO	NO	NO	3	B2
109	722937	NO	NO	NO	NO	YES (COVID19)	4	C2
110	814242	NO	NO	NO	NO	NO	4	A
111	807822	NO	NO	NO	NO	NO	3	B1
112	797695	NO	NO	NO	NO	NO	2	B2
113	815666	NO	NO	NO	NO	NO	3	A
114	113838	NO	NO	NO	NO	NO	4	B2
115	819731	NO	NO	NO	NO	NO	1	B2
116	279242	NO	NO	NO	NO	NO	3	B2
117	822013	NO	NO	NO	NO	NO	2	B1
118	754163	NO	NO	NO	NO	NO	5	A
119	796655	NO	NO	NO	NO	NO	2	A
120	543344	NO	NO	NO	NO	NO	3	B2
121	825905	NO	NO	NO	NO	NO	3	B2
122	826901	NO	NO	NO	NO	NO	3	B2
123	827771	NO	NO	NO	NO	NO	2	A
124	833788	NO	NO	NO	NO	NO	2	B2

S No.	MRD No	Date	Initials	Age(yrs)	Gender	Occupation	BMI	Diagnosis	Knee Involved	Side of proposed TKA	Duration of complaints	Duration	Under Treatment	Duration	Under Treatment	Duration	Under Treatment	Smoking	Cancer	Obesity	Inactivity & Immobilisation	FAMILY HISTORY OF PRIOR VTE/ ANTICOAGULANT USE	INTRAVENOUS DRUG USE	HORMONAL REPLACEMENT THERAPY
												Hypertension		Diabetes Mellitus		Coronary artery								
125	833729	10/21/2019	KK	70	FEMALE	HOUSEWIFE	26.4	OA	BILATERAL	BILATERAL	2-5YRS	9YRS	YES	10YRS	YES	-	NO	NO	NO	NO	NO	NO	NO	NO
126	837992	10/30/2019	RK	65	FEMALE	HOUSEWIFE	27	OA	BILATERAL	LEFT	2-5YRS	10YRS	YES	8YRS	YES	-	NO	NO	NO	NO	NO	NO	NO	NO
127	840848	11/1/2019	JD	68	FEMALE	DEPENDENT	23.8	OA	BILATERAL	LEFT	5-10YRS	-	NO	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
128	440788	11/6/2019	DKC	75	MALE	DEPENDENT	22.6	OA	BILATERAL	BILATERAL	5-10YRS	15YRS	YES	10YRS	YES	-	NO	NO	NO	NO	NO	NO	NO	NO
129	844092	11/6/2019	RK	58	FEMALE	HOUSEWIFE	22.5	RA	BILATERAL	BILATERAL	2-5YRS	-	NO	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
130	848822	11/14/2019	RP	64	MALE	POLITICIAN	26.7	OA	BILATERAL	LEFT	2-5YRS	7YRS	YES	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO
131	848463	11/14/2019	SK	78	FEMALE	HOUSEWIFE	26.3	OA	BILATERAL	LEFT	5-10YRS	15YRS	YES	17YRS	YES	-	YES	NO	NO	NO	NO	NO	YES	NO	NO
132	553348	11/15/2019	RK	71	FEMALE	HOUSEWIFE	25.4	OA	BILATERAL	BILATERAL	2-5YRS	10YRS	YES	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO	NO
133	848856	11/18/2019	SK	43	FEMALE	HOUSEWIFE	22.8	RA	BILATERAL	RIGHT	2-5YRS	-	NO	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO	NO
134	869901	11/20/2019	SB	58	FEMALE	HOUSEWIFE	25.6	OA	BILATERAL	BILATERAL	2-5YRS	-	NO	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO	NO
135	147142	11/24/2019	GR	63	MALE	RETIRED	24.6	OA	RIGHT	RIGHT	<1YR	-	NO	10YRS	YES	-	NO	NO	NO	NO	NO	NO	YES	NO	NO
136	855967	11/25/2019	SN	55	FEMALE	HOUSEWIFE	25.7	OA	BILATERAL	BILATERAL	2-5YRS	7YRS	YES	5YRS	YES	CONGENI	YES	NO	NO	NO	NO	NO	YES	NO	NO
137	855821	11/26/2019	MK	57	FEMALE	HOUSEWIFE	25.7	OA	BILATERAL	BILATERAL	2-5YRS	7YRS	YES	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO	NO
138	857179	11/27/2019	RK	58	FEMALE	DEPENDENT	24.2	OA	BILATERAL	BILATERAL	2-5YRS	-	NO	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO	NO
139	863946	12/9/2019	BS	70	MALE	DEPENDENT	23.9	OA	BILATERAL	BILATERAL	5-10YRS	-	NO	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO	NO
140	547513	12/12/2019	DS	61	MALE	RETIRED	27.7	OA	LEFT	LEFT	<1YR	-	NO	-	NO	1 YR	YES	NO	NO	NO	NO	NO	YES	NO	NO
141	668292	12/12/2019	SK	58	FEMALE	DEPENDENT	26	OA	RIGHT	RIGHT	2-5YRS	-	NO	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO	NO
142	577595	12/19/2019	SS	66	MALE	RETIRED	23.7	OA	LEFT	LEFT	1-2 YRS	-	NO	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO	NO
143	869350	12/19/2019	SG	63	FEMALE	HOUSEWIFE	24.2	OA	BILATERAL	BILATERAL	2-5YRS	8YRS	YES	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO	NO
144	43583	12/19/2019	MK	58	FEMALE	DEPENDENT	25.4	OA	LEFT	LEFT	2-5YRS	-	NO	7YRS	YES	-	NO	NO	NO	NO	NO	NO	NO	NO	NO
145	872560	2/4/2020	RSS	72	MALE	RETIRED	28	OA	RIGHT	RIGHT	5-10YRS	6YRS	YES	5YRS	YES	10YRS	YES	NO	NO	NO	NO	NO	YES	NO	NO
146	879284	1/12/2020	NS	61	MALE	DEPENDENT	25.3	OA	RIGHT	RIGHT	2-5YRS	3YRS	YES	-	NO	-	NO	YES	NO	NO	NO	NO	NO	NO	NO
147	880790	1/21/2020	S	64	FEMALE	HOUSEWIFE	27.3	OA	BILATERAL	BILATERAL	5-10YRS	9YRS	YES	8YRS	YES	-	NO	NO	NO	NO	NO	NO	NO	NO	NO
148	884953	1/23/2020	MB	51	FEMALE	HOUSEWIFE	25.3	OA	BILATERAL	BILATERAL	2-5YRS	5YRS	YES	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO	NO
149	252502	1/29/2020	R	58	FEMALE	DEPENDENT	24.2	OA	BILATERAL	BILATERAL	2-5YRS	-	NO	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO	NO
150	889353	1/30/2020	S	70	MALE	FARMER	28.4	OA	BILATERAL	BILATERAL	5-10YRS	5YRS	YES	2YRS	YES	-	NO	NO	NO	NO	NO	NO	NO	NO	NO
151	5175	2/4/2020	K	44	FEMALE	TEACHER	22.5	OA	LEFT	LEFT	2-5YRS	-	NO	2YRS	YES	-	NO	NO	NO	NO	NO	NO	NO	NO	NO
152	820663	2/5/2020	BK	53	FEMALE	TEACHER	25	OA	BILATERAL	LEFT	2-5YRS	-	NO	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO	NO
153	891459	2/7/2020	MK	77	FEMALE	HOUSEWIFE	29.9	OA	BILATERAL	RIGHT	2-5YRS	5YRS	YES	-	NO	10YRS	YES	NO	BREAST	NO	NO	NO	YES	NO	NO
154	897395	2/14/2020	UNS	70	MALE	RETIRED	25.8	OA	BILATERAL	BILATERAL	2-5YRS	10YRS	YES	5YRS	YES	7YRS	YES	NO	NO	NO	NO	NO	YES	NO	NO
155	636015	2/18/2020	GK	52	FEMALE	WORKING	24.3	OA	RIGHT	RIGHT	2-5YRS	-	NO	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO	NO
156	903197	2/21/2020	AM	53	FEMALE	HOUSEWIFE	23.1	OA	BILATERAL	BILATERAL	1-2YRS	-	NO	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO	NO
157	902001	2/21/2020	HK	60	FEMALE	HOUSEWIFE	28.6	OA	BILATERAL	BILATERAL	5-10YRS	3YRS	YES	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO	NO
158	905266	2/25/2020	KB	73	FEMALE	HOUSEWIFE	26.9	OA	BILATERAL	BILATERAL	5-10YRS	-	NO	15YRS	YES	-	NO	NO	NO	NO	NO	NO	NO	NO	NO
159	889880	2/28/2020	AK	79	FEMALE	DEPENDENT	26.1	OA	RIGHT	RIGHT	5-10YRS	20YRS	YES	-	NO	15YRS	YES	NO	NO	NO	NO	NO	YES	NO	NO
160	897457	3/2/2020	SB	60	FEMALE	DEPENDENT	23.9	OA	BILATERAL	BILATERAL	5-10YRS	-	NO	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO	NO
161	909261	3/2/2020	SB	70	FEMALE	HOUSEWIFE	22.5	OA	BILATERAL	RIGHT	5-10YRS	15YRS	YES	15YRS	YES	-	NO	NO	NO	NO	NO	NO	NO	NO	NO
162	907421	3/4/2020	SR	55	FEMALE	HOUSEWIFE	24.5	OA	BILATERAL	BILATERAL	2-5YRS	-	NO	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO	NO
163	913425	3/11/2020	GK	76	FEMALE	DEPENDENT	25.9	OA	BILATERAL	BILATERAL	>10YRS	16YRS	YES	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO	NO
164	908313	3/12/2020	SK	58	FEMALE	DEPENDENT	23.3	OA	BILATERAL	BILATERAL	2-5YRS	-	NO	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO	NO
165	907753	3/13/2020	GK	51	FEMALE	HOUSEWIFE	25.9	OA	BILATERAL	BILATERAL	2-5YRS	-	NO	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO	NO
166	917430	3/16/2020	SB	70	FEMALE	DEPENDENT	24.9	OA	BILATERAL	LEFT	>10YRS	15YRS	YES	-	NO	-	NO	NO	NO	NO	NO	NO	NO	NO	NO

S No.	MRD No	CURRENT MEDICATION	Inflammatory /autoimmune disease	ACTIVE CANCER	Paralysis / Paresis or recent plaster immobilization of lower extremities at Preop/Immediate postop/ Postop period/At 1 mnth/At 3	RECENT BEDRIDDEN FOR 3 DAYS OR MAJOR SURGERY WITH LAST 3 MONTHS	Localized tenderness along the deep venous system at Preop/Immediate postop/ Postop	Entire leg swollen at Preop/Immediate postop/ Postop period/At 1 mnth/At 3 mnth	Calf swelling>3cm larger than asymptomatic side at Preop/Immediate postop/ Postop	Pitting oedema confined to symptomatic leg at Preop/Immediate postop/ Postop	Collateral superficial veins at Preop/Immediate postop/ Postop period/At 1 mnth/At	Previously documented DVT	Alternative diagnosis as likely as DVT at Preop/Immediate postop/ Postop period/At 1 mnth/At	Clinical probablity of DVT Likely/Unlikely at Preop/Immediate postop/ Postop period/At 1 mnth/ At 3 mnth
125	833729	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
126	837992	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
127	840848	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
128	440788	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
129	844092	YES	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
130	848822	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
131	848463	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
132	553348	TB AMLONG MT	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
133	848856	FOR RA	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
134	869901	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
135	147142	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
136	855967	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
137	855821	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
138	857179	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
139	863946	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
140	547513	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
141	668292	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
142	577595	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
143	869350	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
144	43583	TB PIOGLIT	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
145	872560	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
146	879284	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
147	880790	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
148	884953	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
149	252502	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
150	889353	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
151	5175	TB GLYKIND M	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
152	820663	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
153	891459	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
154	897395	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
155	636015	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
156	903197	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
157	902001	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
158	905266	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
159	889880	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
160	897457	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
161	909261	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
162	907421	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
163	913425	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
164	908313	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	ON	UNLIKELY
165	907753	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	UNLIKELY
166	917430	NO	NO	NO	NO	NO	NO	NO	NO	NO	-	NO	NO	UNLIKELY

S No.	MRD No	Clinical signs and symptoms of DVT at Preop/Immediate postop/ Postop period/At 1 mnth/ At 3 mnth	PE is #1 Diagnosis or equally likely at Immediate/Post op/At 1 mnth/ At 3 mnth	Heart rate >100? At Immediate Postop	Heart rate >100? At Postop/At 1 mnth/At 3 mnth	Immobilization at least 3 days or surgery in previous 4 weeks previously objectively diagnosed as PE or DVT at Immediate/Post op/At 1 mnth/ At 3 mnth	Hemoptysis? at Immediate/Post op/At 1 mnth/ At 3 mnth	Malignancy with treatment within 6 months or palliative at Immediate/Post op/At 1 mnth/ At 3 mnth	PE likely/unlikely at Immediate/Post op/At 1 mnth/ At 3 mnth	Dyspnoea	Chest Pain	Bleeding from wound site/ wound hematoma	Upper GI bleed	Lower GI bleed	Mortality	Length of stay (days)	Readmission
125	833729	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
126	837992	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	6	NO
127	840848	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	6	NO
128	440788	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
129	844092	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
130	848822	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
131	848463	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	6	NO
132	553348	NO	NO	YES	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
133	848856	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	YES	NO	NO	NO	6	NO
134	869901	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
135	147142	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
136	855967	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	8	NO
137	855821	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
138	857179	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
139	863946	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
140	547513	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	6	NO
141	668292	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	6	NO
142	577595	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
143	869350	NO	NO	YES	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
144	43583	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	6	NO
145	872560	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	6	NO
146	879284	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	6	NO
147	880790	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
148	884953	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
149	252502	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	YES	NO	NO	NO	7	NO
150	889353	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
151	5175	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	6	NO
152	820663	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	8	NO
153	891459	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
154	897395	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
155	636015	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	6	NO
156	903197	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
157	902001	NO	NO	YES	NO	NO	NO	NO	UNLIKELY	NO	NO	YES	NO	NO	NO	7	NO
158	905266	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
159	889880	NO	NO	NO	NO	NO	-	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	6	NO
160	897457	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
161	909261	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
162	907421	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
163	913425	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	6	NO
164	908313	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
165	907753	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	7	NO
166	917430	NO	NO	NO	NO	NO	NO	NO	UNLIKELY	NO	NO	NO	NO	NO	NO	6	NO

S No.	MRD No	Major bleeding	Minor Bleeding	Resurgery/any surgery	History of fall	Unplanned visit to hospital	Charlson Comorbidity Index	Charnley Classification
125	833729	NO	NO	NO	NO	NO	3	B2
126	837992	NO	NO	NO	NO	NO	4	B1
127	840848	NO	NO	NO	NO	NO	3	B1
128	440788	NO	NO	NO	NO	NO	5	B2
129	844092	NO	NO	NO	NO	NO	2	B2
130	848822	NO	NO	NO	NO	NO	3	B1
131	848463	NO	NO	NO	NO	NO	5	B1
132	553348	NO	NO	NO	NO	NO	4	B2
133	848856	NO	NO	NO	NO	NO	1	B1
134	869901	NO	NO	NO	NO	NO	2	B2
135	147142	NO	NO	NO	NO	NO	3	A
136	855967	NO	NO	NO	NO	NO	2	B2
137	855821	NO	NO	NO	NO	NO	2	B2
138	857179	NO	NO	NO	NO	NO	2	B2
139	863946	NO	NO	NO	NO	NO	3	B2
140	547513	NO	NO	NO	NO	NO	3	A
141	668292	NO	NO	NO	NO	NO	2	A
142	577595	NO	NO	CONTRALATERAL TKA	NO	NO	3	A
143	869350	NO	NO	NO	NO	NO	3	B2
144	43583	NO	NO	NO	NO	NO	3	A
145	872560	NO	NO	NO	NO	NO	5	A
146	879284	NO	NO	NO	NO	NO	3	A
147	880790	NO	NO	NO	NO	NO	4	B2
148	884953	NO	NO	NO	NO	NO	2	B2
149	252502	NO	NO	NO	NO	NO	2	B2
150	889353	NO	NO	NO	NO	NO	4	B2
151	5175	NO	NO	NO	NO	NO	2	A
152	820663	NO	NO	NO	NO	NO	2	B2
153	891459	NO	NO	NO	NO	YES (PAINFUL STIFF LEG)	4	B1
154	897395	NO	NO	NO	NO	NO	2	B2
155	636015	NO	NO	NO	NO	NO	2	A
156	903197	NO	NO	NO	NO	NO	2	B2
157	902001	NO	NO	NO	NO	NO	2	B2
158	905266	NO	NO	NO	NO	NO	5	B2
159	889880	NO	NO	NO	NO	NO	5	A
160	897457	NO	NO	NO	NO	NO	2	B2
161	909261	NO	NO	NO	NO	NO	4	B1
162	907421	NO	NO	NO	NO	NO	2	B2
163	913425	NO	NO	NO	NO	NO	4	B1
164	908313	NO	NO	NO	NO	NO	2	B2
165	907753	NO	NO	NO	NO	NO	2	B2
166	917430	NO	NO	NO	NO	NO	3	B1

Baba Farid University
of Health Sciences
Sadiq Road
Faridkot-151 203 (Pb). INDIA.
Phone : 01639-256232,256236
Tele/Fax : 01639-256235
Email – Examination@bfuhs.ac.in

No. BFUHS/2K19p-TH/ 12199 Date 15/5/19

The Principal,
DMC, Ludhiana.

Subject: Approval of Plan of Thesis.

This is to inform you that the Faculty of Medical Sciences in its meeting held on 29.05.2019 has approved the plan of thesis of **Amol Rattan**, a student of your college for **MS Orthopaedics** along with the names of Supervisor/Co-Supervisor as under:-

Topic Plan of Thesis

Role of aspirin in venous thromboembolism (vte) prophylaxis following total knee arthroplasty

Supervisor
Dr. Deepak Jain
Assoc. Prof.,
Dept. of Orthopaedics,
DMCH, Ludhiana.

Co-Supervisor
Dr. Shekhar Singhal
Asst. Prof.,
Dept. of Orthopaedics,
DMCH, Ludhiana.

The student has to submit the four copies of thesis (along with PDF format) , to the Controller of Examinations, BFUHS, Faridkot, at least six months before the commencement of theory examination, if he/she is otherwise eligible to take the examination. He /She must directed to attach a photocopy of this letter with the forwarding letter while submitting thesis to the University along with the letter of approval of University for change of supervisor/Co-Supervisor, change of topic,(if any).

Dr. S P Singh MS(Oph)
Controller of Examinations

Note :

113. If any discrepancy found regarding topic of thesis or Supervisor/Co-Supervisor, inform undersigned within one month after issue of this letter.

114. The student may submit the thesis as per the schedule already conveyed i.e for May/June examination 30th Nov of the preceding the year of examination and for Nov/Dec examinations 31st May of the year of examination.

ROLE OF ASPIRIN IN VENOUS THROMBOEMBOLISM (VTE) PROPHYLAXIS FOLLOWING TOTAL KNEE ARTHROPLASTY

THESIS PROPOSAL

FOR APPROVAL OF SUBJECT OF THESIS TO BE SUBMITTED

IN PARTIAL FULFILMENT OF THE REQUIREMENTS

FOR THE DEGREE OF

MASTER OF SURGERY

IN

ORTHOPAEDICS

OF THE

BABA FARID UNIVERSITY OF HEALTH SCIENCES

FARIDKOT

NOVEMBER, 2018

DR. AMOL RATTAN

DEPARTMENT OF ORTHOPAEDICS
DAYANAND MEDICAL COLLEGE & HOSPITAL, LUDHIANA
LUDHIANA, PUNJAB-141001

ABSTRACT OF PLAN OF THESIS

Title	ROLE OF ASPIRIN IN VENOUS THROMBOEMBOLISM (VTE) PROPHYLAXIS FOLLOWING TOTAL KNEE ARTHROPLASTY
For the degree of	MS ORTHOPAEDICS
Name of the candidate	Dr. Amol Rattan
Supervisor	Dr. Deepak Jain, Associate Professor, Department of Orthopaedics, DMCH, Ludhiana
Co-supervisors	Dr. Shekhar Singhal, Assistant Professor, Department of Orthopaedics, DMCH, Ludhiana
Institution	Dayanand Medical College & Hospital, Ludhiana
University	Baba Farid University of Health Sciences, Faridkot

Introduction: Patients undergoing total knee arthroplasty (TKA) are at risk of venous thromboembolism (VTE) including deep vein thrombosis (DVT) and pulmonary embolism (PE). Because of the relatively high incidence of VTE, prophylaxis has been recommended after (TKA). 2. Various agents used for DVT prophylaxis in use are aspirin, heparin, LMWH, factor Xa inhibitors, direct thrombin inhibitors etc. Many of these agents are expensive and cause side effects like bleeding, skin necrosis, thrombocytopenia, hematoma etc. Acetylsalicylic acid (aspirin) is an effective agent for VTE prophylaxis following a (TKA). Many studies have shown its efficacy in minimising VTE after TKA. It is inexpensive and well-tolerated, and its use does not require routine blood tests. The interest in this molecule for VTE prophylaxis has increased in the last few years. Its role needs to be redefined especially in Indian population.

Aim: To study the role of aspirin in venous thromboembolism (VTE) prophylaxis following total knee arthroplasty.

Material & Methods: It will be a prospective obervational study over a period of one and half years year from January 2019 to June 2020 at the Department of Orthopaedics, Dayanand Medical College, Ludhiana. Patients undergoing primary (TKA) will be included in the study.

Clinical Significance: Aspirin is an extensively studied antithrombotic agent that irreversibly inhibits the activity of cyclooxygenase (COX) in platelets. COX-1 and 2 isoenzymes catalyse the conversion of arachidonic acid to prostaglandin (PG) H2 and the production of thromboxane A2 (TXA2) and PGI2.Aspirin exerts its activity by inhibiting COX-1, which in turn inhibits the production of TXA2. Aspirin can prevent the subendothelial deposition of platelets and the aggregation of new platelets.14 The Virchow triad, consisting of a combination of endothelial damage, venous stasis and hypercoagulability, can trigger the development of thrombosis. All three components are relevant in lower limb arthroplasty. This study will establish the role of aspirin in VTE prophylaxis after total knee arthroplasty.

Keywords: DVT: Deep vein thrombosis, Aspirin: Acetyl salicylic acid, TKA: Total knee arthroplasty, PE: Pulmonary embolism.

(Signature) Candidate	(Signature) Co-supervisor	(Signature) Supervisor	(Signature) Principal

CERTIFICATE OF FACILITIES AVAILABLE

This is to certify that the facilities for work on the subject of thesis titled **"ROLE OF ASPIRIN IN VENOUS THROMBOEMBOLISM (VTE) PROPHYLAXIS FOLLOWING TOTAL KNEE ARTHROPLASTY"** exist in the Department of Orthopaedics, DMC&H, Ludhiana, and will be provided to the candidate. We will see that the data being included in the thesis are genuine and is collected by the candidate himself under our supervision and guidance.

SUPERVISOR:

Dr. Deepak Jain
Associate Professor
Department of Orthopaedics
DMC&H, Ludhiana

CO-SUPERVISOR:

Dr. Shekhar Singhal
Assistant Professor
Department of Orthopaedics
DMC&H, Ludhiana

Dr. Rajnish Garg
Professor & Head
Department of Orthopaedics
DMCH, Ludhiana

Place: Ludhiana

Date: 20/12/18

APPROVAL PROFORMA
BY
RESEARCH & ETHICAL COMMITTEE
DAYANAND MEDICAL COLLEGE & HOSPITAL, LUDHIANA

Name of candidate	Dr. Amol Rattan
Department	ORTHOPAEDICS
Topic of Thesis	ROLE OF ASPIRIN IN VENOUS THROMBOEMBOLISM (VTE) PROPHYLAXIS FOLLOWING TOTAL KNEE ARTHROPLASTY
Likely date of appearing in PG examination	MAY 2021
Date of enrollment	MAY 10, 2018
Name of Head of Department	Dr. Rajnish Garg
1) Supervisor **2) Co-Supervisor**	Dr. Deepak Jain Dr. Shekhar Singhal
Signature of Members of Research Committee with Stamp	**Signature of Members of Ethics Committee with Stamp**
1. HOD Pharmacology	1. HOD Physiology
2. HOD Surgery	2. HOD Pathology
3. HOD Pathology	3. HOD Pharmacology
4. HOD Medicine	4. HOD SPM
5. Dean Academics	5. HOD Medicine
6. Vice Principal	6. HOD Surgery
	7. HOD Obst. & Gynae
	8. Legal Expert
	9. Secretary, IEC
	10. Dean Academics
	11. Vice Principal
	12. Principal

Approved: Yes / No

Chairperson
Research Committee

Chairperson
Research Committee

Approved: Yes / ~~No~~

Chairperson
Ethics Committee

Chairperson
Ethics Committee

BABA FARID UNIVERSITY OF HEALTH SCIENCES FARIDKOT

PROFORMA FOR REGISTRATION OF SUBJECT FOR DISSERTATION

1	NAME OF THE CANDIDATE AND ADDRESS	DR. AMOL RATTAN.
2	NAME OF THE INSTITUTE	DAYANAND MEDICAL COLLEGE AND HOSPITAL, LUDHIANA
3	COURSE OF STUDY AND SUBJECT	MASTER OF SURGERY, ORTHOPAEDICS
4	DATE OF ADMISSION OF COURSE	10th May, 2018
5	TITLE OF THE TOPIC	ROLE OF ASPIRIN IN VENOUS THROMBOEMBOLISM (VTE) PROPHYLAXIS FOLLOWING TOTAL KNEE ARTHROPLASTY

6. BRIEF RESUME OF INTENDED WORK:

6.1 NEED FOR STUDY

There are many chemical agents for VTE prophylaxis, there is a difference in their efficacy and the risk of bleeding. The choice of agent therefore relies on a balance between the desire to minimise VTE and the attempt to reduce the risk of bleeding, with its undesirable and occasionally fatal consequences. Acetylsalicylic acid, which is generally known as aspirin, is an agent for the prevention of VTE following arthroplasty. Many studies have reported its in minimising VTE following arthroplasty. In recent years, there has been a dramatic shift, especially in North America, towards the use of aspirin as the main modality for VTE prophylaxis following arthroplasty.[1-3]

Besides the proven efficacy, it is inexpensive and well tolerated, and its use does not require routine blood monitoring. It is also a milder' agent that is unlikely to result in haematoma formation, which may require further surgery, and which increases the risk of infection. Aspirin is also less likely to be associated with persistent wound drainage, with all its undesirable consequences, than agents such as low-molecular-weight heparin (LMWH) or other more aggressive agents.[4]

There are other reasons also of increasing use of aspirin as VTE prophylaxis. The advances in anaesthesia and surgical techniques have changed the nature of arthroplasty. The use of regional anaesthesia, multimodal pain management with less reliance on opioid, and the effective conservation of blood allows most patients to walk within hours of their surgery, unlike in the recent past, when patients would be unable to walk for several days after the operation.

The fact that an arthroplasty is a more routine and predictable procedure means that patients present earlier for surgery and are therefore more mobile pre-operatively. The association between haematoma formation, persistent wound drainage and periprosthetic infection has also sensitised the orthopaedic community towards the use of less aggressive VTE prophylaxes, such as aspirin, that minimise the risk of these complications.

The present study will redefine the role of aspirin in VTE prophylaxis after TKR and establish it in Indian context also.

6.2 REVIEW OF LITERATURE

Patients undergoing a knee arthroplasty are at risk of venous thromboembolism (VTE) including deep vein thrombosis (DVT) and pulmonary embolism (PE). In the absence of prophylaxis, VTE may occur in more than 35% of patients undergoing an arthroplasty.[5] Because of the relatively high incidence of VTE, prophylaxis has been recommended after knee arthroplasty.[3]

The Virchow triad [5] for thrombosis, consisting of a combination of endothelial damage, venous stasis and hypercoagulability, can trigger the development of thrombosis. All three components are relevant in lower limb arthroplasty. The development of a venous thrombus often starts in the region of a valve where the pattern of blood flow becomes abnormal, resulting in endothelial dysfunction Stagnant blood in a linear section of the blood vessel leads to hypoxia, which in turn initiates thrombogenesis and the aggregation of platelets.

Symptoms of DVT may include calf pain, swelling, redness, warmth of affected area. DVT can lead to Pulmonary embolism, CVA, systemic embolism, post thrombotic syndrome etc.

Pulmonary embolism may present as shortness of breath, anxiety, bluish skin, chest pain, fainting, irregular heartbeat, restlessness, weak pulse. If these symptoms are seen, then the patient will be assessed with CT Pulmonary angiography.

Agents used for prophylaxis of DVT are Heparin, LMWH, Fondaparinaux, Direct thrombin inhibitors, factors Xa inhibitors, aspirin, ADP receptor blockers etc.

Aspirin is an extensively studied antithrombotic agent that irreversibly inhibits the activity of cyclooxygenase (COX) in platelets.[7] COX-1 and 2 isoenzymes catalyse the conversion of arachidonic acid to prostaglandin (PG) H2 and the production of thromboxane A2 (TXA2) and PGI2. TXA2 induces vasoconstriction, whereas PGI2 induces vasodilatation and inhibits the aggregation of platelets. Aspirin exerts its activity by inhibiting COX-1, which in turn inhibits the production of TXA2. Aspirin can prevent the subendothelial deposition of platelets and the aggregation of new platelets.[6]

There are many studies and guidelines which have proven the efficacy of aspirin after TKA.

The recent ACCP guidelines, recommended that aspirin prophylaxis should only be continued for ten to 14 days after arthroplasty, with the recommendation having strong evidence, but also suggesting extended prophylaxis for 30 to 35 days with weak evidence.[8]

Brandon R Hood and coworkers [9] In this study of patients undergoing TKA, aspirin was not inferior to other in the postoperative rate of VTE or death. Aspirin alone may provide similar protection from postoperative VTE compared with otheranticoagulation treatments.

Hunt LP, Ben-Shlomo Y, Clark EM, Dieppe P, Judge A, MacGregor AJ[10] showed that mechanical and chemical thromboprophylaxis with heparin with or without aspirin were associated with a decreased 90-day mortality in 409 096 patients undergoing primary THA. They also reported140 that the 45-day mortality with aspirin after TKA was slightly lower than the mortality with heparin.

Gutowski and coworkers [11] reported that the use of aspirin compared with warfarin following arthroplasty reduced the costs related to VTE by shortening the length of hospital stay and lowering the incidence of PE and of all complications related to VTE prophylaxis ($p < 0.001$ for all). They did not take into account the cost of monitoring treatment with warfarin, which is time consuming, invasive, and expensive.

In a study by **Raphael et al** [3], patients receiving warfarin for VTE prophylaxis after arthroplasty had a six times higher incidence of PE compared with those receiving aspirin.

Many other studies have further shown the efficacy of aspirin in minimising VTE following arthroplasty, all recording its action on the venous (black clot) circulation. The dose of aspirin remains controversial. Many studies regarding the effective dose of aspirin for DVT prophylaxis have been done. Both high and low doses have been used.

Many studies have shown that a dose of 325 mg twice daily is effective for the prevention of symptomatic VTE.

There are many other studies showing the efficacy of low dose aspirin in minimising VTE, and a lower incidence of gastrointestinal bleeding than with the higher doses.

The **PEP** [13] trial evaluated the efficacy of low dose aspirin (160 mg/day). The relevant literature includes studies evaluating a wide range of doses of aspirin as VTE prophylaxis with doses of 75 mg,13 81 mg,92 100 mg, 150 mg [11] 160mg,162 mg,250 mg,300 mg, 325 mg, 600 mg,24 650 mg, 1200mg,1300 mg and 3600 mg. One unresolved issue in relation to the dose is the variation in the sensitivity to aspirin among patients. There is no routine screening test

that predicts this sensitivity. It has been shown that aspirin at doses of between 30mg and 150mg is sufficient to inhibit platelet COX-1 function.

A recent cross-over study at the **Rothman Institute** [14] showed that low dose aspirin (81 mg twice a day) was as effective as a higher dose (325 mg twice a day), with the lower dose being associated with fewer gastrointestinal side effects. The recommendation of that study was that low dose aspirin should be used for the prevention of VTE following arthroplasty.

The initial **AAOS** [15-17] **guidelines** on the prevention of VTE published in 2007 recommended that aspirin prophylaxis should continue for six weeks after an arthroplasty. Other protocols advocate using aspirin until discharge from hospital or for seven days, 14days, 21 days, 28 days, or six weeks.

The last ten years have seen a major change in delivery of orthopaedics. The implementation of strategies such as day of surgery admission, use of regional anasthesia, reduce operating time and fast track analgesia have early mobilisation and agressive rehabilitation resulting in mean length of hospital stay to five days. Strategies like these contribute to reduction in complications due to deep vein thrombosis and subsequently pulmonary embolism.

6.3 AIMS AND OBJECTIVES OF THE STUDY

To study the role of aspirin in prevention of venous thromboembolism (VTE) following total knee arthroplasty.

7.0 MATERIALS AND METHODS

7.1 SOURCE OF DATA

The purpose of study is to review and analyse the role of aspirin in prevention of venous thromboembolism (VTE) following total knee arthroplasty. A prospective review of medical records of cases of patient undergoing knee arthroplasty and taking aspirin as DVT prophylaxis agent between January 2019 to May 2020 at Dayanand Medical College, Ludhiana.

7.2 METHOD OF COLLECTION OF DATA

The study will be carried out by taking an informed consent from the patients willing to be a part of the study. Pre-op and Post-op proforma (immediate post-op and at one and three months of follow up), and score will be recorded to assess various factors which affect patient satisfaction.

INCLUSION CRITERIA:

Undergoing TKA for knee arthritis and taking aspirin as DVT prophylaxis in post operative period.

EXCLUSION CRITERIA:

- Patient with underlying chronic DVT.
- Patient with underlying prior VTE event.
- Patient with underlying gastric ulcers.

METHODOLOGY :

- Patients will be assessed pre-operatively using a proforma with Wells criteria for DVT and for pulmonary embolism.

1. Patients will be given Low molecular weight heparin (Enoxaparin 40mg OD s/c) during hospital stay along and will be started on tab Aspirin 150mg once daily for four weeks at discharge.Physical therapy will be started on first postoperative day. Patients will be re assessed, post operatively on post operative day 1,at discharge, suture removal and at one and three months followup.

Adverse events like dyspnoea, tachycardia, chest Pain, haemoptysis, bleeding from wound site or wound hematoma which requires surgical intervention, upper GI bleed, lower GI bleed will be monitored.

Venous doppler will be done if Well's score probability score is more than 2 for DVT or in case of clinical signs/symptoms of DVT. CT angiography will be done in case of suspected pulmonary embolism changes or Well's PE score more than 4.

OUTCOME

The present study will help in determining percentage of patients presenting with symtoms of VTE after .taking aspirin as VTE prophylaxis agent for 4 weeks.

STATISTICAL ANALYSIS

Data will be described in terms of range; mean ±standard deviation (± SD), median, frequencies (number of cases) and relative frequencies (percentages) as appropriate. All statistical calculations will be done using

SPSS (Statistical Package for the Social Science) SPSS 21 version statistical program for Microsoft Windows.

7.3 DOES THE STUDY REQUIRE ANY INVESTIGATIONS OR INTERVENTIONS TO BE CONDUCTED ON PATIENTS OR OTHER HUMANS OR ANIMALS? IF SO, PLEASE DESCRIBE BRIEFLY.

NO

7.4 HAS THE ETHICAL CLEARANCE BEEN OBTAINED FROM ETHICAL COMMITTEE OF YOUR INSTITUTION IN CASE OF 7.3?

YES

8. LIST OF REFERENCES

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PROFORMA

S.No. Date:

Name: Age/Sex:

MRD No. Admission no.

Father/Husband Name: Occupation of Self:

Weight: ____ kg Height: _____ cm BMI: ____

Diagnosis: OA / RA / Others Knee Involved: Right/Left/Bilateral

Date of proposed TKA: Side of proposed TKA: Right/ Left/ Bilateral

Duration of complaints: > 10 y/ 5 – 10 y/ 2 – 5 y / 1 – 2 y/ ≤1 years prior to TKA

Associated Ailments:

	Duration	Under Treatment
Hypertension :		
Diabetes Mellitus :		
Coronary artery disease :		
Smoking :		
Cancer :		
Obesity :		
Inactivity and immobilisation:		
Drug History :		
Intravenous drug use :		
Family history of prior VTE/anticoagulant use		
Hormonal replacement therapy :		
Inflammatory/ Autoimmune disease		
Current medication :		

Signature of Candidate **Signature of Supervisor**

Modified Well's Criteria for DVT	Preop	Immediate postop	At Discharge (Day 7)	At Suture Removal	At 1 mnth	At3 mnth
Active cancer						
Paralysis, paresis or recent plaster immobilization of lower extremities						
Recently bedridden for three days or major surgery within the last 12 weeks						
Localized tenderness along the deep venous system						
Entire leg swollen						
Calf swelling >3cm larger than asymptomatic side						
Pitting oedema confined to symptomatic leg						
Collateral superficial veins						
Previously documented DVT						
Alternative diagnosis as likely as DVT						
Clinical probability of DVT						
Likely						
Unlikely						
Modified Well's Criteria For Pulmonary Embolism						
Clinical signs and symptoms of DVT						
PE is #1 Diagnosis or equally likely						
Heart rate >100?						
Immobilization at least 3 days or surgery in previous 4 weeks previous objectively diagnosed PE or DVT						
Hemoptysis?						
Malignancy with treatment within 6 months or palliative						
Patient has none of these						
Clinical probability of PE						
PE likley						
PE unlikely						

Follow up:

Adverse events:

Dyspnoea -

Tachycardia -

Signature of Candidate **Signature of Supervisor**

Hemoptysis -

Bleeding from wound site/ wound hematoma -

Upper GI bleed -

Lower GI bleed -

Mortality -

ANNEXURE

Modified Well's Criteria for DVT	
Active cancer	+1
Paralysis, paresis or recent plaster immobilization of lower extremities	+1
Recently bedridden for three days or major surgery within the last 12 weeks	+1
Localized tenderness along the deep venous system	+1
Entire leg swollen	+1
Calf swelling >3cm larger than asymptomatic side	+1
Pitting oedema confined to symptomatic leg	+1
Collateral superficial veins	+1
Previously documented DVT	+1
Alternative diagnosis as likely as DVT	-2
Clinical probability of DVT	
Likely	<2
Unlikely	>2

Modified Well's Criteria For Pulmonary Embolism	
Clinical signs and symptoms of DVT	YES 3
PE is #1 Diagnosis or equally likely	YES 3
Heart rate >100?	YES 1.5
Immobilization at least 3 days or surgery in previous 4 weeks previous objectively diagnosed PE or DVT	YES 1.5
Hemoptysis?	YES 1
Malignancy with treatment within 6 months or palliative	YES 1
Patient has none of these	
Clinical probability of PE	
PE likely	>4
PE unlikely	<4

Signature of Candidate **Signature of Supervisor**

INFORMED PATIENT CONSENT

Date: _____

I.....D/o, W/o, S/o.....

am willing to participate in the study **"ROLE OF ASPIRIN IN VENOUS THROMBOEMBOLISM (VTE) PROPHYLAXIS FOLLOWING TOTAL KNEE ARTHROPLASTY"** The procedure with its complications has been explained to me in local vernacular language. I have fully understood that no special tests and extra expenditure in any form, merely for the purpose of thesis is being carried out. I am free to opt out the study any time without assigning any reason.

.....
Signature of the Witness

Name:

.....
Signature of the patient

Signature of Candidate

Signature of Supervisor

मरीज अनुमति फार्म

तिथि _____

मैं _____ पत्नी/पुत्र/पुत्री _____ निवासी _____ इस शोधकार्य **"ROLE OF ASPIRIN IN VENOUS THROMBOEMBOLISM (VTE) PROPHYLAXIS FOLLOWING TOTAL KNEE ARTHROPLASTY"** में भाग लेने के लिए सहमत हूँ। मैं इस शोधकार्य में भाग लेने के लिए अपनी स्वेच्छा से तैयार हूँ। मैं पुष्टि करता/करती हूँ की यह स्वीकृति देने के लिए मुझे कोई आर्थिक प्रलोभन नहीं दिया गया और न ही दबाव डाला गया है। मुझे इस शोधकार्य का उद्देश्य स्पष्ट कर दिया गया है और मुझे यह विश्वास है की यह विज्ञान और मानवता के लाभ के लिए है। मुझे इस शोधकार्य में होने वाले जोखिम के बारे में समझा दिया गया है और मेरी समझ में यह जोखिम बहुत मामुली है।

मैं इस शोधकार्य में भाग लेने के सम्बन्ध में किसी भी समय अपनी अस्वीकृति व्यक्त कर सकता/सकती हूँ और मेरे अस्वीकृति व्यक्त करने का मेरे इलाज पर कोई प्रभाव नहीं पड़ेगा।

_____
गवाह के हस्ताक्षर
नाम:

_____
रोगी के हस्ताक्षर/अंगूठे का निशान
नाम:

_____
अन्वेषक के हस्ताक्षर

_____
विद्यार्थी के हस्ताक्षर

ਮਰੀਜ਼ ਰਜ਼ਾਮੰਦੀ ਫਾਰਮ

ਮਿਤੀ_____

ਮੈ_____ਪਤਨੀ/ਪੁੱਤਰ/ਪੁੱਤਰੀ_____

ਵਾਸੀ _____

"ROLE OF ASPIRIN IN VENOUS THROMBOEMBOLISM (VTE) PROPHYLAXIS FOLLOWING TOTAL KNEE ARTHROPLASTY" ਤੇ ਚਲ ਰਹੀ ਖੋਜ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਲਈ ਰਜ਼ਾਮੰਦ ਹਾਂ। ਇਸ ਖੋਜ ਕੰਮ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਲਈ ਮੈ ਆਪਣੀ ਮਰਜ਼ੀ ਨਾਲ ਤਿਆਰ ਹਾਂ। ਮੈ ਇਹ ਦਸਣਾ ਚਾਹੁੰਦਾ ਹਾਂ/ ਚਾਹੁੰਦੀ ਹਾਂ ਕੇ ਇਹ ਰਜ਼ਾਮੰਦੀ ਦੇਣ ਵਾਸਤੇ ਮੈਨੂ ਕਿਸੇ ਵੀ ਤਰਾਂ ਦਾ ਲੋਭ-ਲਾਲਚ ਨਹੀ ਦਿੱਤਾ ਗਿਆ ਅਤੇ ਨਾ ਹੀ ਕੋਈ ਦਬਾ ਪਾਇਆ ਗਿਆ ਹੈ। ਮੈਨੂ ਇਸ ਖੋਜ ਦਾ ਮਨੋਰਥ ਸਮਝਾ ਦਿੱਤਾ ਗਿਆ ਹੈ ਅਤੇ ਮੈਨੂ ਇਹ ਭਰੋਸਾ ਦਵਾਇਆ ਗਿਆ ਹੈ ਕੇ ਇਹ ਖੋਜ ਵਿਗਿਆਨ ਅਤੇ ਮਾਨਵਤਾ ਦੀ ਭਲਾਈ ਲਈ ਹੈ। ਮੈਨੂ ਇਸ ਖੋਜ ਵਿਚ ਹੋਣ ਵਾਲੇ ਖਤਰੇ ਬਾਰੇ ਸਮਝਾ ਦਿੱਤਾ ਗਿਆ ਹੈ ਅਤੇ ਮੈਨੂ ਇਹ ਯਕੀਨ ਹੈ ਕੇ ਇਹ ਖਤਰਾ ਬਹੁਤ ਮਾਮੂਲੀ ਹੈ। ਮੈਨੂ ਇਸ ਖੋਜ ਕੰਮ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਦਾ ਢੰਗ – ਤਰੀਕਾ ਸਮਝਾ ਦਿੱਤਾ ਗਿਆ ਹੈ।

ਮੈ ਇਸ ਖੋਜ ਕੰਮ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਬਾਰੇ ਆਪਣੀ ਰਜ਼ਾਮੰਦੀ ਕਿਸੇ ਵੀ ਸਮੇ ਵਾਪਸ ਲੈ ਸਕਦਾ ਹਾਂ/ ਸਕਦੀ ਹਾਂ ਅਤੇ ਮੇਰੀ ਰਜ਼ਾਮੰਦੀ ਵਾਪਸ ਲੈਣ ਦਾ ਮੇਰੇ ਇਲਾਜ ਤੇ ਕੋਈ ਅਸਰ ਨਹੀ ਹੋਵੇਗਾ।

_____ _____

ਗਵਾਹ ਦੇ ਹਸਤਾਖਰ ਮਰੀਜ਼ ਦੇ ਹਸਤਾਖਰ

ਮਿਤੀ_____ ਮਿਤੀ_____

ਪਤਾ _____ ਪਤਾ _____

_____

ਨਿਰੀਖਕ ਦੇ ਹਸਤਾਖਰ

_____

ਸਿਖਿਆਰਥੀ ਦੇ ਹਸਤਾਖਰ